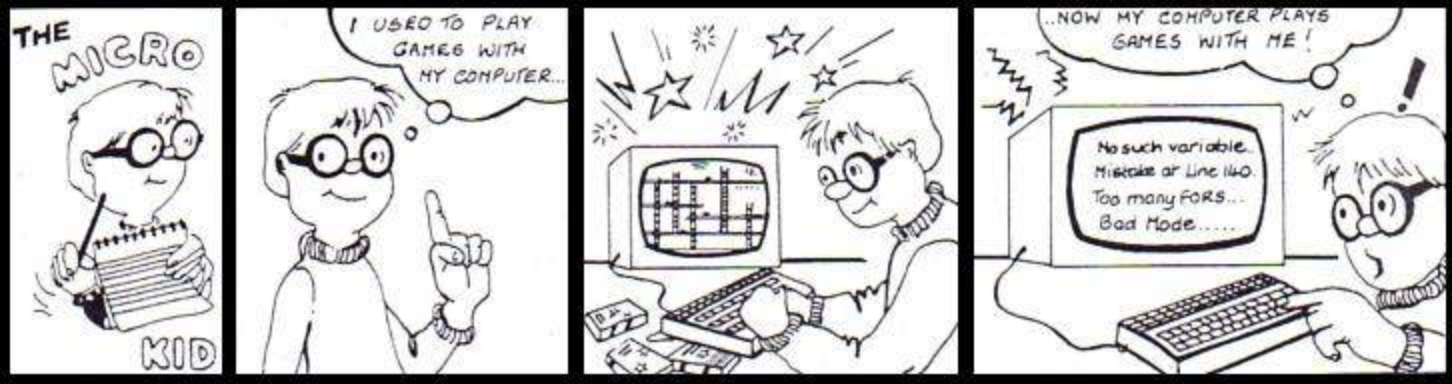
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A Database Publication

electron user

Vol. 7 No. 5 February 1990 £1.25

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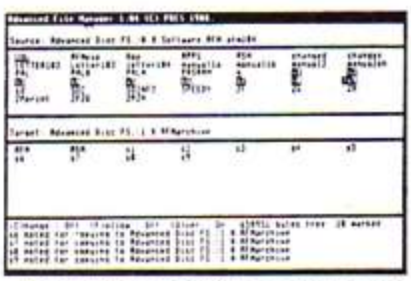

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CONTENTS

Cover Story

23 Discs

Everything you ever wanted to know about discs and disc drives, but were a little reluctant to ask.

6 News

All the latest developments in the world of the Electron. Plus the latest Gallup chart.

8 Pendragon

Another bundle of hints, tips, maps and solutions from our resident arch exponent of adventure wizardry.

11 Arcade Corner

Stuck at the start of Ricochet? These solutions to the first two levels are sure to get you going.

13 Software

Fab Four – a top-notch compilation – and that superb arcade adventure Last Ninja 2 come under our reviewers' spotlight.

16 Life

Play the generation game in this super-fast, modern computerised version of the classic simulation of multi-cellular society.

19 Remsave

Cut down on typing with this handy utility which automatically saves files with the right name.

22 Time Warp

Barry Woods takes a trip back to the very first stand-alone issue of Electron User.

29 Fireworks

Just enter a few simple parameters to create your own animated firework display with this fascinating graphic utility.

30 Memory Master

Find out what has happened to your micro's memory with this utility to display Basic's system variables.

32 10 Liners

More mini-programming marvels from our talented readers – it's amazing what can be crammed into so little space.

37 Deflector

Be warned: You'll soon be tearing your hair out when you play this frustrating, yet simple, ball game.

38 Plotter

Puzzled by facts and figures? Then turn them into pictures by drawing line graphs, bar and pie charts in 2D or full colour 3D.

41 Micro Messages

A selection of the many interesting and lively letters you have been sending to Electron User *over the past few weeks.*

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Back to school

10 educational games for the Electron for just £5.95

Order on Page 45

It's a promising year for Electron owners

SUPERIOR Software boss Steve Hanson has made 1990 a year of promise for Electron owners.

"A long time ago we took the decision to go into BBC/Electron software and we see no reason to go back on it", he told *Electron User*. "There is still a strong market out there and we will continue to serve it".

Backing up this vote of confidence, Steve has already launched into the new year with a vengeance.

Sam is back again with version 12 of the Play It Again series from Superior (0652 58585). *Electron User* gave readers of hint of the latest Sam in the December issue and can now reveal the final line-up.

Sam 12 includes an updated version of the evergreen 20 level aligator-type game Blagger. Improvements include sound on/off and the ability to stay on the same level when all lives are lost.

Skirmish is second in line. It's the classic jousting game from programmer Delos D.Harriman. Top selling BBC/Electron game of 1989 The Last Ninja is number three and completing the line-up is boxing simulation By Fair Means or Foul. Usual Sam prices of £9.95 for cassette and £11.95 for disc.

Screen shots from Blagger... *...and Skirmish*

Early in February look out for a brand new Electron game from Superior. Called Perplexity, it's a cross between Repton and Pacman. The basic Pacman formula is combined with strategy and problem solving, moving through 16 levels with four different backgrounds. The 3D levels get inreasingly harder so watch out for the final ones. Price £9.95.

Electron owners who have longed for their own version of last year's eight bit hit Robo Cop could soon have it. As *Electron User* went to press, Steve was in discussions with huge games house Ocean for the rights to produce a BBC/Electron version of this favourite.

When it comes it may be a bit more expensive than the usual Superior price but well worth the extra. Watch this space.

More disc games are on the way

THERE was a time when Electron games on disc were few and far between but this is no longer the case, thanks to John Huddleston of Pres (0276 72046).

Pres has secured the licence to reproduce 50 Superior titles on disc and this operation is now well under way.

First offering, out just before Christmas, included Arcadians, Meteor, Snooker, Magic Mushrooms,Monsters, Qwak, Video's Revenge and Bug Buster.

This was due to be followed by the next disc containing Starship Command, Maze, Killer Gorilla II, Frak, Cosmic Camouflage, Constellation. Prices: 3.5in ADFS £11.

Highway patrol

TYNESOFT'S New Year treat for Electron owners takes them to the rough tough world of California. It's Beverley Hills Cop, the company's popular multi-game Christmas offering on other formats.

Players join Detective Axel Foley on a day's patrol. First duty is to try and prevent all out warfare on the streets by stopping consignments of arms getting to gangland trouble makers.

Variety is the name of this game, with action moving on to a car chase followed by a commando-type game and ending with a maze. Electron cassette costs £9.99.

Let your micro get a head

FAITHFUL Electron owners build up a fondness for their machines which is unusual in the computer world. It's a trait which could make them a prime target for the latest American craze.

Those who remember the fashion for pet rocks should brace themselves for a new wave of trans-Atlantic anthropomorphism. Computer critters have been launched on an unsuspecting market by Celsus Designs Inc.

They provide your machine with stick-on head, arms and legs and are aimed at encouraging children to use computers or at adults with a sense of fun. Computer critters are not yet available in the UK and cost $40 in the USA.

Disc labels

WHEN discs are re-used, labels have to be scribbled over or peeled off. To solve this problem, Blackstuff (0737 833015) has produced Pollylabels, erasable labels which come in packs of 50 with marker and eraser pens, cotton wipes, erasing fluid and colour coding stickers for £11.95.

Gallup Software Chart

THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	1	PAPERBOY *Encore*	Back in the charts with a vengeance after a long absence. It's a pity about the flicker and slow speed – get a Turbo.	2.99
2	2	PLAY IT AGAIN SAM 10 *Superior*	An excellent arcade compilation presenting you with the golden oldies of Zalaga, 3D Dotty, Repton thru Time and debuting Qwak.	9.95
3	5	STRIKE FORCE HARRIER *Alternative*	Now available on a budget label, you can take off with this excellent Mirrorsoft flight simulator at a bargain price.	2.99
4	•	YIE AR KUNG FU *Hit Squad*	There have been many clones and any combat game is invariably compared to it. A nice trip into meaningless violence if you like that sort of thing.	2.99
5	•	MINI OFFICE *Alternative*	Now available at a budget price, this integrated package is a good introduction to more serious applications.	1.99
6	6	PLAY IT AGAIN SAM 9 *Superior*	Not seen before is Camelot, whereas you can renew your acquaintance with Spycat, Steve Davis and Repton. One of the better Sam compilations.	9.95
7	•	INDOOR SOCCER *Alternative*	If you are tired of the outdoor variety it is probably time to go inside. Not the best football implementation, but OK for a wet Sunday afternoon.	1.99
8	•	PALACE OF MAGIC *Superior*	Enter the palace of puzzles and foes and enjoy this arcade adventure. You could buy it on Sam 3 for the same price if you wanted.	9.95
9	•	STRYKER'S RUN *Blue Ribbon*	First in the next generation of Superior/CDS re-releases. One you really must have in your collection if you missed it first time out.	2.99
10	10	JOE BLADE *Players*	The original romp for community-conscious Joe. With a third mission about to hit the streets, buy this while you still can.	1.99
11	3	SUPERIOR SOCCER *Superior*	By combining the arcade and the management routines into one composite program the punter has the best of both worlds.	9.95
12	4	CHUCKIE EGG *A&F*	Yes he's back again, and this really is an oldie now. One of the first games available, you won't have egg on your face if you buy it.	9.95
13	15	SNAPPER *Acornsoft*	If you search hard enough you can still find this full-priced version, though it's better value as part of the Sam 7 compilation.	9.95
14	•	COMMANDO *Elite*	A Rambo-style shoot-'em-up against the odds. Now on a budget label, but you can also buy this as part of the Play it Again Sam 3 compilation.	2.99
15	13	SUBWAY VIGILANTE *Players*	Your angelic presence must strike to make the underground safe for trams. A hack and slash martial arts game with little out of the ordinary to offer.	2.99
16	•	FRUIT MACHINE *DK Tronics*	A cheap way to beat the odds. Can you get a set of apples, pears or bars? But lacks the thrill of real pocket being at stake.	9.95
17	7	LAST OF THE FREE *Audiogenic*	Still selling well even without a budget label. You may have to search hard to buy it now, but it's well worth the trouble.	7.95
18	•	JOE BLADE 2 *Players*	The graphics are good and the game very playable. The puzzle screens are wicked and will keep scratching your head for hours.	2.99
19	12	PLAY IT AGAIN SAM 8 *Superior*	The third compilation this month, with Winter Olympiad, Quest, Around the World in 40 Screens and Mr Wiz taking starring roles.	9.95
20	•	SOCCER BOSS *Alternative*	Back again. Not a very new title but try it if you fancy your chances for soccer boss stardom. At this price you have little to lose.	1.99

Adventures

By Pendragon

Onwards, ever onwards

THE year moves on and the first signs of spring are beginning to appear as bright orange and violet crocuses poke their heads through the white blanket of snow. Not that either I nor any of my knights will be poking our heads out into the snow – well not quite yet.

We are now all in our third month of hibernation, huddled around fires and purring Electrons, struggling ever onwards to solve those mysteries of silicon fantasy. I can at last sense the end of Gateway to Karos and hopefully with a bit of perseverence will finish it this week. To celebrate I will now offer some more tips to supplement those given last month:

To stop the Kobolds from stealing your lamp, pull the lever on the copper tube as soon as they appear. Throw the metal sphere to get past the griffin. Blow the horn loudly to get past the serpent. If you are having problems getting the treasure out of the dragon's cave, give him the berries to eat, and wear the cap of invisibility and the gloves.

Rub the crystal to obtain the combination to get beyond Khoronz's laboratory. The Gateway itself is a strange object to master as it can only be approached from the West side. It is best to explore for yourself and work how best you can enter it from that direction.

I am making equally good progress with Level 9's Red Moon and also hope to finish the Price of Magik. Hints to both adventures will be posted here in due course.

Meanwhile, Quondam is still baffling me, and the prize of a copy of the original Magus game, Village of Lost Souls, still awaits the sender of the first full solution I receive to this classic Acornsoft adventure.

I also have a brand new disc copy of Avon and Murdac to give away to the sender of the first solution or set of maps I receive to Topologika's other teasers, the recreated Philosopher's Quest and Countdown to Doom. But note, that it is solutions to the Topologika updates I need, not the original Acornsoft versions of these games.

I was pleased earlier in the month to receive a letter from long- time contributor Barbara Gibb, who offers help with most standard and expanded Electron adventures – her list is far too lengthy to print.

She would be delighted to hear from any reader who is having difficulties in particular games, but rightly insists that if you want a reply you must include a stamped self-addressed envelope – and please don't ask for full solutions. Reach her at 52 Burford Road, Liverpool L16 6AQ.

I also received a letter from Jonathan Forster, of Tiger Soft, to say that the company's first Electron adventure, The Magic of Merlin, is now due for release. This 300 location jaunt is available on cassette and is priced at £7.99. I await a review copy of this long promised game with great interest.

A series of intriguing cheats and pokes found their way on to my desk this month. The adventurer responsible was none other than Geoff Livesey, who has passed on many such routines in the past.

For those of you who may stoop to such underhand methods, these snippits might be of interest: To list the innards of Sphinx Adventure type:

```
"
?&5774=&FF
*FX200,0
LIST
```

and hey presto, all will be revealed. To do the same with Philosophers Quest press Break followed by:

```
FOR I%=1 TO 302:PROCM(I%):NEXT
```

Or with Classic Adventure, follow Break with:

```
FOR I%=1 TO 140:?&0D=I%:CALL &15
9B:PRINT:G=GET:NEXT
```

Finally, this month's featured map is of the openings to Kansas City's Ring of Time. This

Readers' Hall of Fame

Acheton *Bob Purder*

After dropping the fleece, turban, spice and horn you must continue in your quest South East, Down, East and drop the clock. Now return to the slab – open the door and go South, East, East and East.

Drop the keys, take the gin, thread and marble and go to the cliff as before. Drop the lamp and drop the gin.

Turn the lamp off, fill your bottle, go to the pyramid, drop the bottle and eat the cactus. Now go Down, follow the Balrog – but be careful – and TAKE SCARAB and TAKE QYWINROL.

Go Down again, take the helmet, go to the Gate of Isis, take the coral and venture through the gate. Now follow Yelka and take the torque.

Go to the Snake Maze, take the bracelet and the carbuncle. Sacrifice the scarab, torque, coral, bracelet, carbuncle, palantir and the helmet at the second location of the Snake Maze. Then finish the maze, take the silk and candlestick.

Travel back via the mummy to the Isis Gate. Eat the mushroom, go through the gate, take the rope and SAY WORD. Now tie the rope, go Down, visit the Sphinx and drop the helmet anywhere.

Take six treasures, drop the palantir and visit Star-room 2. DROP ALL, take the lamp and palantir, SAY ZOOGE and go West. Return to the slab room, take the plate, mink and gloves.

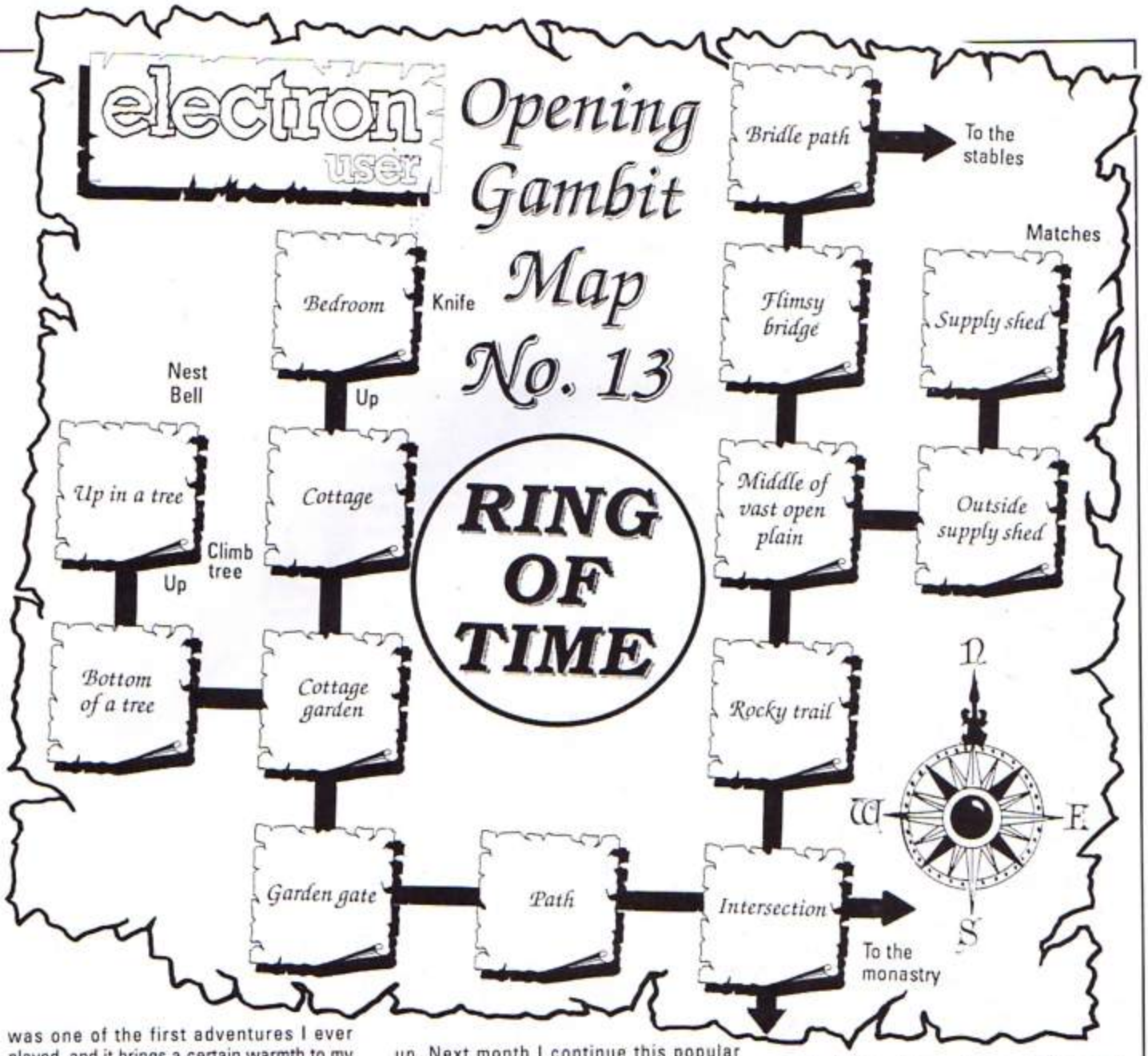
Go Up, North, North and North to the ice fork, go North twice more, look at the palantir and take the garnet. Go back South and West and take the habergeon. Continue East, East, drop the plate, Down, South-East and take the agate.

Now return North West, Up, North West, South, South East, South, South and Down to the slab room. Turn the lamp off, SAY ZOOGE, turn the lamp on again and drop all the treasure which you have just collected – ensuring you drop the habergeon in the slab room.

Go through the toll room, collect the amber, amethyst and chess set, get the cross from the Gallery and get the stake from DEroom 3. Go to Star-room 5, SAY ZOOGE and drop the amber, amethyst, chess set, cross and stake.

Enter the Timeless Cavern, go down the slope and into the mine. Collect the opals, amulet, brooch, jade, lead and quartz, and take the sword from DEroom 5.

(Continued next month)



was one of the first adventures I ever played, and it brings a certain warmth to my bones to display this map for you – I remember how hard I sweated to originally draw it up. Next month I continue this popular series with a guide to the openings to Melbourne House's Classic Adventure.

● *That's it for this month, so until the clock of ages stops, happy adventuring*

Problem solved

The Axe of Kolt *Harry Bastien*

The entry code for part two of this adventure is CLTH LGCH. Upon entering part two, go South, West, West, South-West, South, West and knock on the door. Continue East, North and West.

Now LOOK HEDGE twice, ENTER HEDGE, GET SPEAR, GO HEDGE, travel East and North and examine the bush. Throw the spear, go North, get the spear, examine the bush, then get the bow and arrow. Journey South, South, West, North West, North East, North East and East to the spider.

At this point BRUSH SPIDER, examine it, then go East, East and In. Examine the table, remove the drawer, examine it, TURN DRAWER, get the paper, examine it and leave the room.

Go South and examine the flowers and get the seeds. Now continue North, West, South and examine the pine tree. Break a branch and examine the pine, then travel South East, South West, South and West, and KNOCK DOOR. When your knock is answered, SAY YES and TALK.

GIVE PAPER – a clue on how to kill Morgeth – and go East, North, West, North West, South, South East and examine the dove. Throw the seeds and get the cotton before continuing North West, North, North East, North East, East, East, East and North.

Look East, shoot the partridge, go East and get the partridge. Now journey West, South, West, South, South East, South West, South, West and knock on the door. Examine the bag and go East, North, West, North West, North East and South West to the boar.

Throw the spear, get it, go South-West and examine the river. Next you must empty the bag and cross the river. Now for a tricky bit: Go North, DUCK, JUMP, throw the spear and get it – in that order.

Go North West, North and West to the bush. Examine the bush, break a thorn and return East, South, South East and South to the the river. Cross the river, go North East, North East, East, East and South. Now dip the thorn and attach the cotton.

Once again go North and West to the spider and dip the dart in the poison. Travel West, South West and South West to the river. Cross the river, examine the spear, untie it and insert the dart. Continue South West and examine the vegetation. Crawl into the tunnel, crawl West and look North towards Morgeth.

Blow the dart at Morgeth, crawl East, crawl East, then go North East, West, West, West, examine Morgeth and get the talisman. You are now given the code for part three of this adventure, which is: ASIL ANOM.

(Continued next month)

Adventures By Pendragon

A guide to Electron text adventures

Suds		Riverdale Software, 95 Printon Avenue, Manchester M9 3JW Tel: 061-795 6539
American Suds		
Aussie Suds		
What the Dickens?		

Rick Hanson		Robico, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH Tel: 0442 227354
Project Thesius		
Myorem		
Island of Xaan	A	
Enthar Seven	AD	
The Hunt	G	
Village of Lost Souls	A	
Blood of the Mutineers		
The Rick Hanson Trilogy		
(Probably the best adventures available for the Electron)		

Castle of Skull Lord (Beware, as this adventure contains a few nasty bugs)	Samurai Software, 4/6 Library Street, Wigan.

Galilee		Shards Software, 4 St Andrews Road, London E13 8QD Tel: 01-476 4832
Mystery of the Java Star		
Pettigrew's Diary		
Woodbury End		
Operation Safras		
(Shards is no longer producing adventures, but limited quantities of the above are still available)		

Wizard's Revenge	BBC	Sherston Software, 8 Court Street, Sherston, Malmesbury, Wiltshire. Tel: 0666 840433
Wizard's Return	BBC	

Five Stones of Anadon Eye of Zoltan (Both of these adventures are now very hard to come by and regarded by many as true classics)	Softek, 12-13 Henrietta Street, Covent Garden, London WC2 Tel: 01-240 1422

Star Trek Adventure	BBC	Superior Software, PO Box 6, South Humberside DN2 9NH Tel: 0652 58585
Lost City	BBC	
Colditz Adventure	BBC	
Gideon's Gamble	BBC	
Stranded	G	
(Star Trek Adventure is now very rare, and bears no relationship to the recent game of the same name)		

This is the third and last part of the serialisation of my much requested database of Electron text adventures. The following legend will help you understand some of the symbols I have used:

BBC: Released for the BBC Micro, but will run on an Electron if fitted with Slogger's Master Ram board

D: Disc only adventure
G: Graphics available
A: For advanced adventurers only

TThe Magic of Merlin	Tiger Soft, 46 Sunnymead Avenue, Gillingham, Kent ME7 2DZ Tel: 0634 56014

Acheton	D@A	Topologika, PO Box 39, Stilton, Peterborough PE7 3RL Tel: 0733 244682
Avon	D	
Monsters of Murdac	D	
Countdown to Doom	D@	
Kingdom of Hamil	D@	
Return to Doom	D	
Philosopher's Quest	D@	
(The adventures marked @ are disc-based recodings of the Acornsoft originals)		

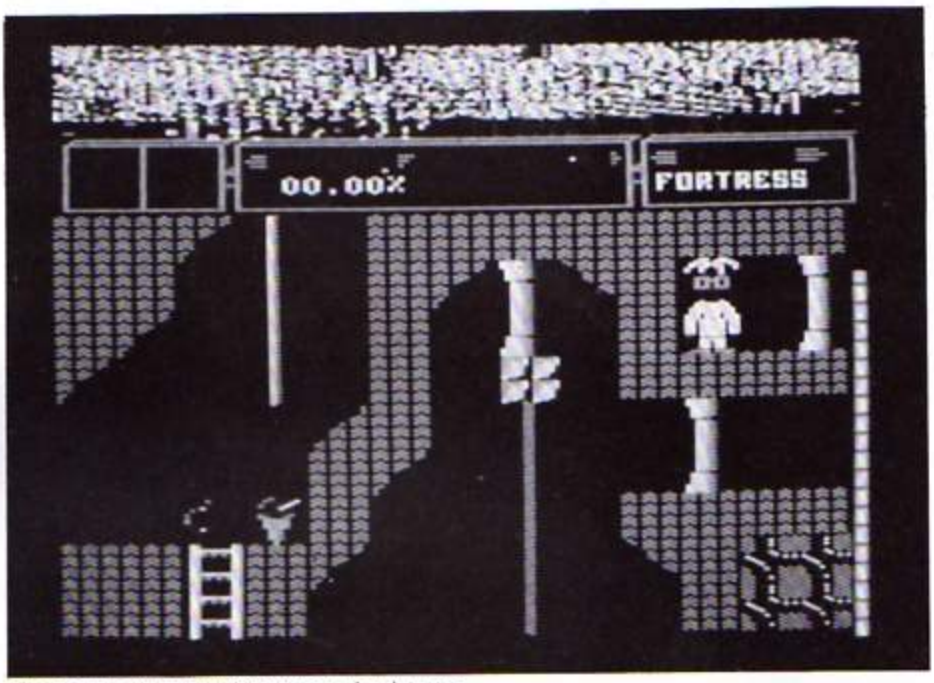
Super Gran		TyneSoft, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE Tel: 091-414 4611
Oxbridge	G	

Silver Mountain Island of Secrets	Usborne Publishing, 20 Garrick Street, London WC2E 9BJ
(Both these adventures come with illustrated books of the games, and type-in listings)	

Space Adventure	Virgin/Mastertronic, 2-4 Vernon Yard, Portobello Road, London W11 2DX Tel: 01-727 8070

Landing Party	Willow Software, The Willows, Wrington Lane, Congresbury, Bristol BS19 Tel: 0934 834056

Get on the ball



Ricochet is a superb multi-screen arcade adventure

MOST of this month's Arcade Corner is devoted to solutions to two levels of Superior Software's superb arcade adventure Richochet. Both solutions are provided by David McMinn of Inverurie, Scotland. But first, here are two quick cheat modes for Predator and Impact:

Predator – Superior Software

Jamie Dutton of Leytonstone, London, says that if you are having problems with this game, when you reach the second level make sure that you have a few bullets left over from level one. Just before you reach the alien, drop your gun and pick it up again. Your ammunition will magically be topped up.

Impact – ASL

James Treadwell of Southport, Lancashire has discovered a cheat mode for this fine variation on that old favourite, Breakout. When on the high score table press Escape, Caps Lk, Control and Shift simultaneously. Now during a game you can press G to advance the weapons indicator and J to jump to the next level.

Richochet – Superior Software

First level

Get key B then key A and open gate B. Open gate A and get key E. Open gate E. Get the note and key C then open gate C. Get the tomato and go to the start and drop the note. Go one screen to the right and drop the tomato. Get keys D and G and use them to open the corresponding gates.

Get the hourglass, pick up the note and powerdrill. Go to Hole-in-Wall and walk through it. Walk into the basket – it will turn into a snake. Go back and get the tomato then walk into the snake.

Go on to the next screen and climb up the chain and over the top. Stand by the pillar and jump up.

Press the * key when you are level with the red square. Keep on trying if you don't pick it up first time.

Walk into WM (white man) and you will get a bag of money, then walk into the robber.

Get key F and the empty bottle. Walk into WM and the bottle will be filled. Open gate F then walk into the cross and you will be given a ghost. Walk into WM and you will get a bunsen burner. Walk into the newspaper and you will receive a flame.

Get the hourglass then go to the screen where you picked up the red square and go down the shaft.

At the bottom there is a secret passage – go down it. You'll find some water down there somewhere – walk into it. Now travel right for a few screens and stand on the strange shape.

Techlev

First collect key C then get the round object. Open gate C then go to the dosh machine and collect the dosh. Get key E then walk into the tax demand. Get key D then open gates E and D. Take the stamp and walk into the letter. Pick up the disc then walk into the postbox and computer. Get NA and C1 and you will get salt.

Take key F then walk into the slug. Open gate F, take the hourglass and key B. Open gate B then stand on the transporter.

Play the part of Schwarzenegger in the computer game of the film of the same name

electron user MAIL ORDER OFFERS

Don't miss out on the mass of material that's appeared in *Electron User* over the past few months. Bring yourself up to date with this back issue bundle, packed with games, utilities, features and programming tutorials.

Here's what you'll find in the August 1989 – January 1990 bundle:

August 1989 issue:
Games: Rollerball, Bingo. *Reviews:* Alps, Turtle Worlds, White Magic, Play it Again Sam 9. *Features:* Map of Kayleth, Repton Infinity tips. *Utilities:* Disc Housekeeper, Mode 2 screen compacter, Titration, Chemical Equations.

September 1989 issue:
Game: Snakes. *Reviews:* Keyword, Basic Editor Plus, Ballistix, Sam 10. *Features:* Arcade Corner, Electron history. *Utilities:* Attribute editor, magazine database.

October 1989 issue:
Game: Spinning frustration, Jet Bike, Robokill. *Reviews:* Rodeo Games, Hi Q Quiz, Spooksville, Rombard. *Features:* Exile solution, Electron carrying case. *Utilities:* Elkpaint, Disc Menu.

November 1989 issue:
Game: Storker's Run, Shopping Spree, Dollar Dash, Octavia. *Reviews:* Ardcade Soccer, White Magic 2, Citizen printer. *Features:* Exile solution, Flowcharts, buyer's guide to printers. *Utilities:* Scroller.

December 1989 issue:
Games: Wishing Wells. *Reviews:* Ricochet, Play It Again Sam II, System 80, Superior Soccer, Sign Writer, Time Lines. *Features:* Ravenskull solution, American Suds map, Break key protector. *Utilities:* Word square solver, screen faser, calendar maker, extended renumber.

January 1990 issue:
Games: Bounce. *Reviews:* Subway Vigilante, Blast, Tomcat, AC Datalink. *Features:* Elite playing guide, Time Warp 1985, adventure tips. *Utilities:* Disc/Taper Index, Sunburst, Pie Chart, graphics compiler, DFS and ADFS disc editors.

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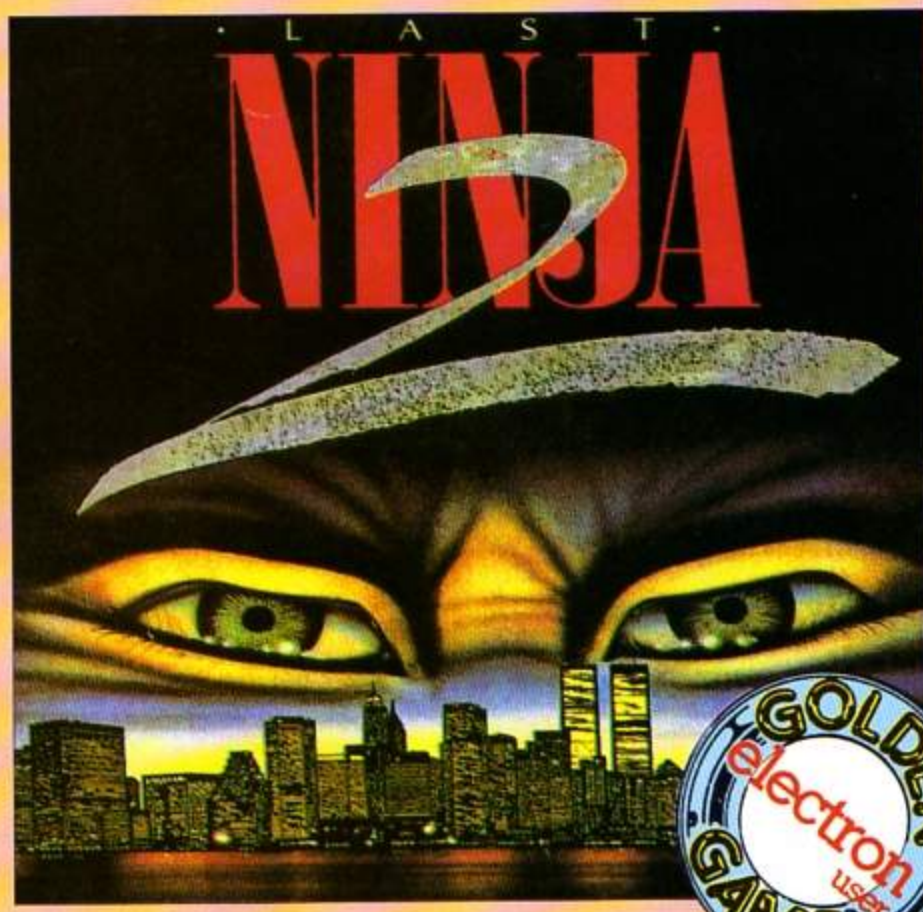
Chop-'em-up



Product: Last Ninja 2
Price: £9.95 (tape)
Supplier: Superior Software, P.O. Box 6, Brigg, S. Humberside DN20 9NH.
Tel: 0625 58585

HAVING finally wiped out the evil that destroyed your relatives and friends you – as the Last Ninja – take a boat to the USA and end up in the Big Apple itself. But here you discover the ultimate evil: Kunitoki.

So, always ready to fight for the good, you don your black Ninja robes to take on the rotting horrors of New York.

You begin standing on a rooftop near Central Park. Going inside you find a thug – who you can easily dispose of – and by being fairly aggressive at the wall you can open a trapdoor and – dropping down into the next room – you find a key.

Going outside you find a rather belligerent policeman – who clearly doesn't think anyone should walk around in broad daylight wearing black robes.

Scattered about are various items to collect and a number of Kunitoki's henchmen – it's best to match them weapon for weapon if you can. The final escape from Central Park involves leaping across a lethal pond , first avoiding a swarm of bees.

You come out on to the street, where more of Kunitoki's hired villains will try to do you in and in an effort to avoid them you take to the sewers where it's very easy to get lost.

Unfortunately there's a lot more hoodlums down here and a crocodile that needs an explosive send off.

From there you make it into the lower levels and Kunitoki's drugs factory with more thugs and plenty of climbing and jumping to do. The exit is guarded by another animal which seems to be in desperate need of food. Standing on lines around here can be lethal.

The next level takes place in some offices where you need to fight your way through even more thugs and villains, across the outside of the building and finally to the roof where a helicopter whisks you to the final level within Kunitoki's castle.

Unlike earlier levels, on the final one any baddies you dispose of are reincarnated each time you re-enter a screen.

The game has been brilliantly executed by that master programmer Peter Scott. The playing keys are carried forward from The Last Ninja as is the overall diagonal movement. Animation is excellent and there's lots of detailed scenery. The puzzles are quite fiendish – and hitting the wall is often beneficial.

It's nice to see that Superior can still come up with high quality, original games. **Steve Turnbull**

GOLDEN electron user GAME

Graphics	*10*
Sound	*8*
Playability	*9*
Value for money	*10*
Overall	*9*

Second Opinion

Last Ninja was a hit when it was first released and this sequel is set to enjoy the same success as the original. The gameplay is similar as is the graphics style, however, the new puzzles and adversaries add new interest to a familiar game. Recommended.

Roland Waddilove

Arcade action revisited

Product: Fab Four Volume One
Price: £9.95
Supplier: Audiogenic, Winchester House, Canning Road, Harrow HA3 7SJ.
Tel: 01-861 1166

THE packaging for this latest ASL release depicts a Sixties-style record player and a title reminiscent of a certain Radio One Sunday evening programme. Is the Fab Four a new game based on those likely lads from Liverpool – Paul, John, George and Ringo? No, it is a compilation of two golden oldies and two spruced up Audiogenic games.

The instructions on the inlay are sufficient to tell you how to find your way around the games, though they could have been better set out.

Psycastria 2 is, unsurprisingly, the sequel to the original, which was highly rated when first released three or four years ago. For me though, this is the first time I have played it. Controlling a small spaceship aboard a massive spacecraft populated by 10 circular energy pods which whizz madly along, it's your mission to destroy each pod before it shoots you.

The ship scrolls horizontally at Ayrton Senna hyperspeed as you try to shoot various bases on the ship. Though sometimes you can zoom along so fast that you crash into a tall building before you know what's hit you.

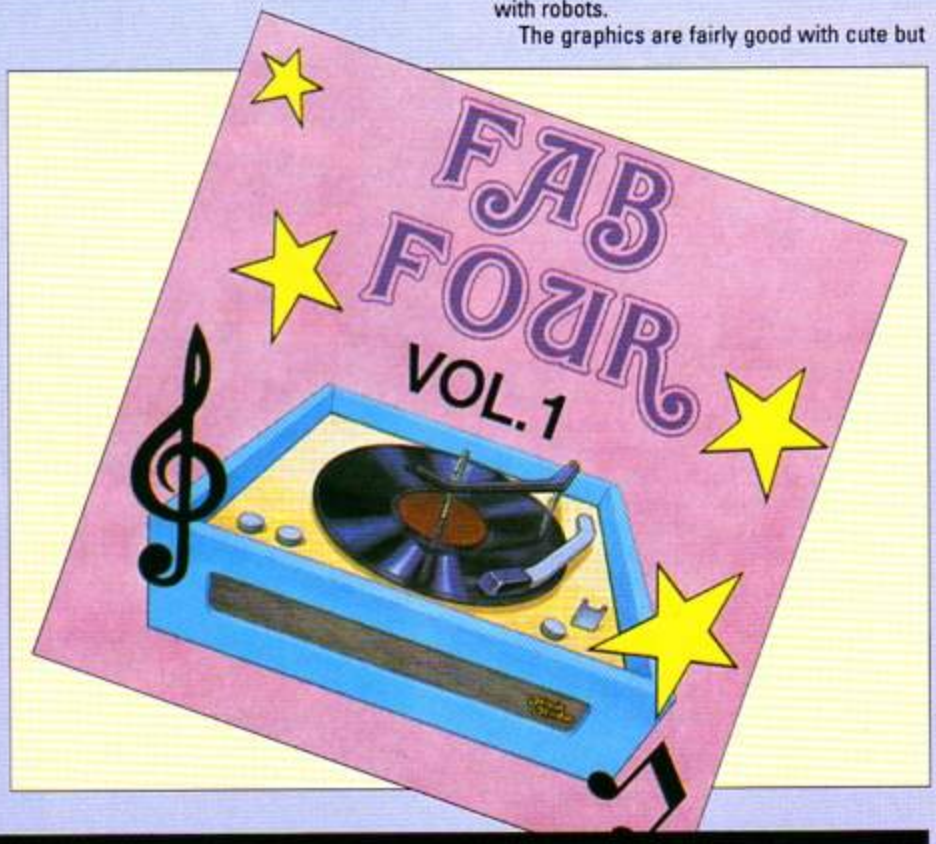
Between each level there is a bonus section where you have to destroy aliens flying across the screen. Unfortunately, I have yet to see what happens then, as I still haven't quite got the knack.

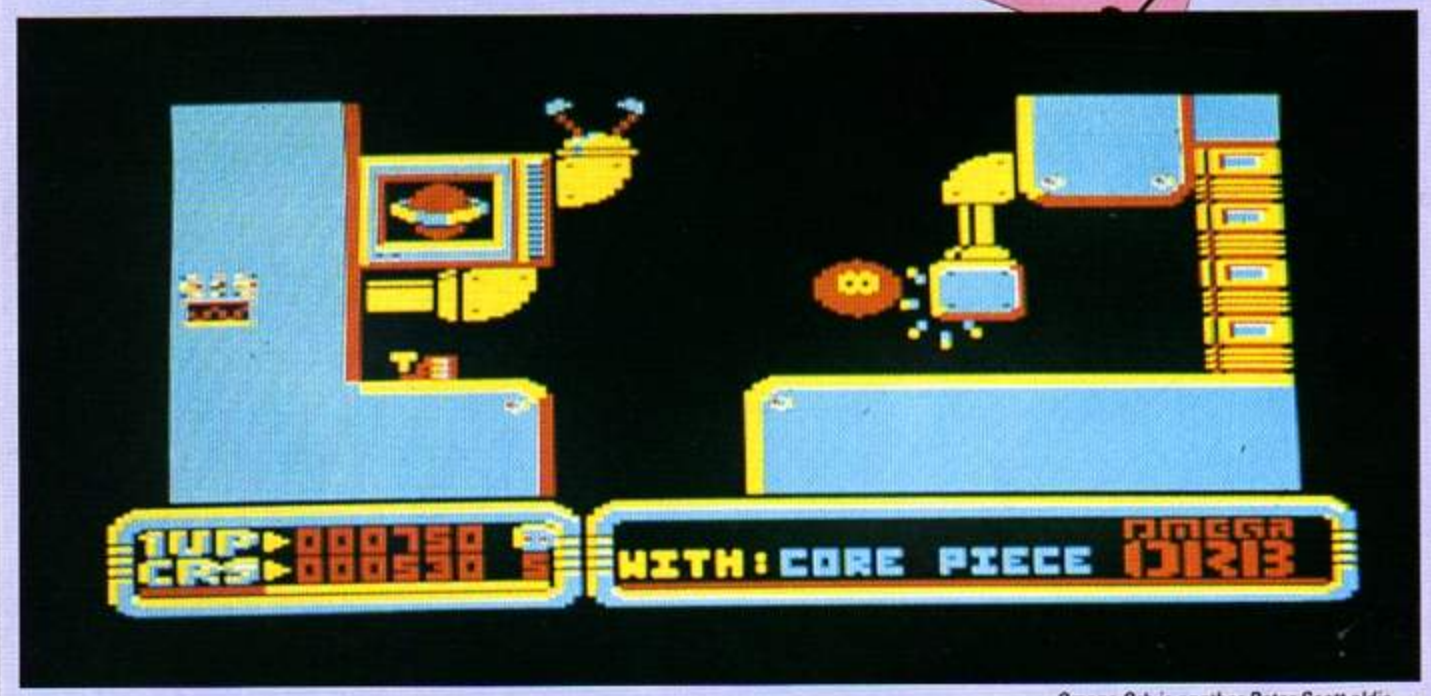
The graphics are clear, colourful and well-detailed and the scrolling flicker-free. Good sound incorporates a lively tune accompanying the high-score table, a nice special effect as you prepare to play and a jolly tune as you enter your name.

Psycastria 2 is difficult but infuriatingly addictive as you just have to have another go to achieve a place on the high-score table or see what happens on the next level.

Thunderstruck 2 is an oldie in which you control an extremely unathletic space-suited person who lumbers his way around a space complex. All sorts of wicked objects lie in wait to put a stop to your mission which is to find four vital parts of the Deacti-Unit. Of course there are many puzzles to be solved on the way, almost all of which involve locked doors and communicating with robots.

The graphics are fairly good with cute but





Omega Orb is another Peter Scott oldie . . .

deadly characters moving horizontally or vertically while you jump around the various ledges on the screen. The graphics bear a more than passing resemblence to SpyCat from Superior. The sound consists of a series of bleeps and a simple end of game tune.

Thunderstruck 2 is a fairly average arcade adventure which doesn't stand out from the crowd, but it kept me glued to my micro for several hours. The puzzles start off easy and become progressively more difficult.

Sphere of Destiny 2 takes over where the original game left off. Once again you control a small spherical droid called Bruce who has unwisely taken up a mission to go through 64 space highways, all of which are constructed from small tiles, set out on five different rows.

Each tile has its own colour which indicates how Bruce will react to it. A yellow or blue tile will have no effect while red will slow him down, green does the opposite and purple makes him jump, cyan reverses the controls, white gives a special bonus, but black holes bring the time limit much closer.

Sphere of Destiny 2 is initially interesting, but as the levels increment, they don't seem to become any more difficult to complete and become repetitive.

Omega Orb is another Peter Scott oldie of 1987 vintage, this time featuring a cute creature which exhibits a beautiful squashy effect when he hits the ground. Moving your Orb around a lunar landscape, through caverns collecting Core Pieces is the basis of the adventure, while evil looking creatures with matching intentions try to hinder your progress.

Large animated sprites, used not only for moving creatures but also for many landscape features, allow you to walk through the scenery. A challenging game, though similar to Thunderstruck.

As four-game compilations go this is a better than average collection, as they all provide a high enjoyment factor. I noticed the cover bears the legend Volume One. Will we be seeing a sequel? I hope so.

Cheetah

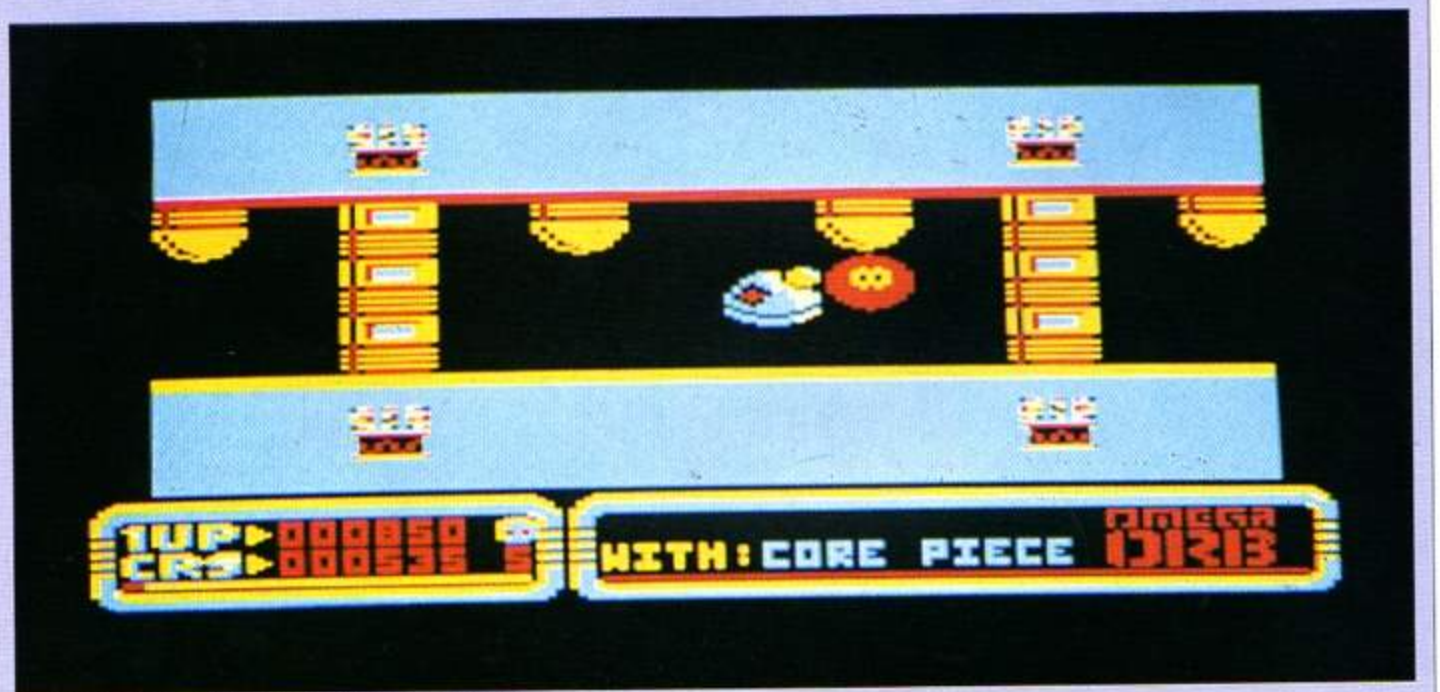
Sound	9
Graphics	8
Playability	9
Value for money	9
Overall	9

Second Opinion

The compilations roll on, and for anyone who hasn't seen these games before it represents excellent value for money as it will provide many hours of enjoyment. It's value is diminished with every title you already posess.

Roland Waddilove

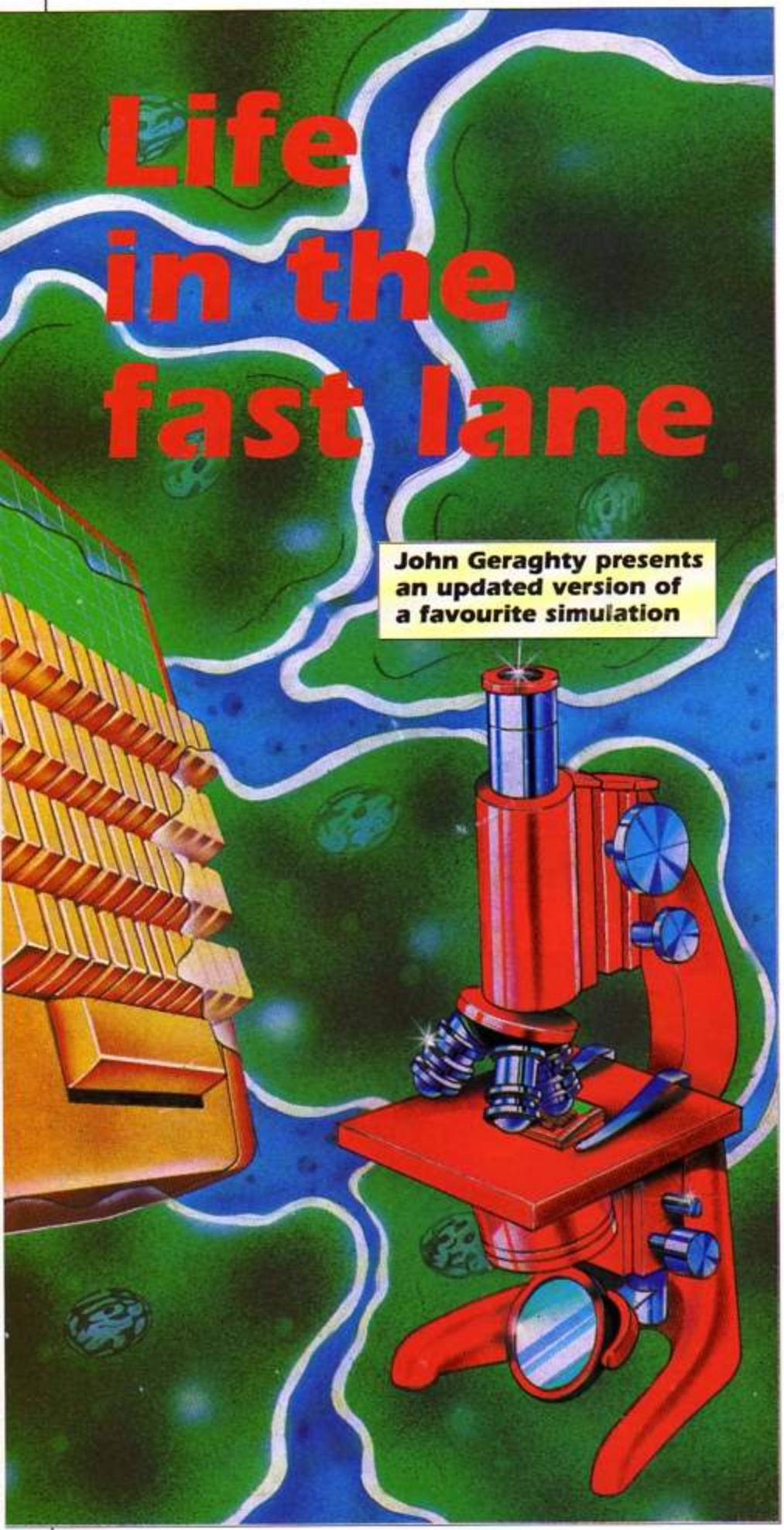
Thunderstruck 2 is another oldie in which you control a space-suited character



. . . featuring large animated sprites and good backgrounds

Life in the fast lane

John Geraghty presents an updated version of a favourite simulation



LIFE is an implementation of that old simulation originally devised by John Conway. The program uses three simple rules to simulate the growth of a colony of cells as it grows and becomes a stable body or completely dies out.

For those unfamiliar with the concept, Life is basically a pattern generation algorithm of extraordinary simplicity and power. The action takes place on a plane divided up into a grid of squares or cells – this Electron version is 40 by 62 cells.

Each cell may be alive or dead initially – you set this up at the start – and each one has eight immediate neighbours. The computer works out the next generation of cells in accordance with the following three simple rules:

- If a given cell has two live neighbours its status will be maintained until the next generation. If alive, it remains alive, and if dead, it remains dead.

- If it has three live neighbours it will be alive in the next generation.

- If it has any other number of live neighbours it will be dead in the next generation.

The variety of patterns that these three rules can create is astonishing. Cells swarm about to form colonies which may become stable or collapse into debris. There are even formations which creep about like amoebas, sending out limbs as they pull themselves along.

To explore the Life universe, type in the program and save it before running it to prevent the possibility of losing your work if you have made a typing error in the assembler section.

When you run it you will automatically enter the editor. Although only 2,480 cells are shown onscreen, the display is torroidal, or wraps around to simulate an infinite plane. Patterns going off one edge of the screen reappear on the opposite edge.

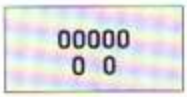
To set a cell, move the cursor with the Z, X, * and ? keys, plus the Shift key if you want double speed, then press Return. Press Return again to delete the cell. You can set several cells at once by holding down Return plus a direction key.

Pressing C toggles the colour option on and off. If you choose to have colour, the new born cells will be shown in green, the mature cells in white and the dying cells in grey. With no colour both the newborn and mature cells will be shown in white and the dying ones will be omitted.

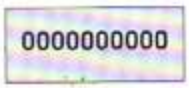
Pressing S toggles the single stepping on and off. This option pauses the display in between each generation so you can study it. Press the Spacebar for the next generation. Press E to enter and exit the editor, starting and stopping the game of life.

There are many fascinating patterns to be discovered, and to get you going, here are a few groups of cells that do interesting things. If you discover any yourself, why not send them in to Micro Messages and share them with other readers?

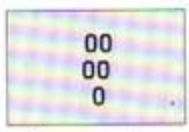
Blinker



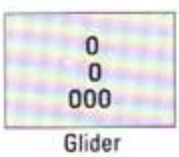
Pulsar



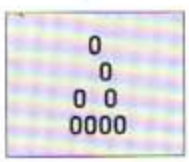
Produces a pentadecathlon



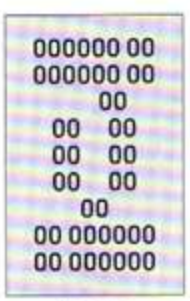
R-pentomino



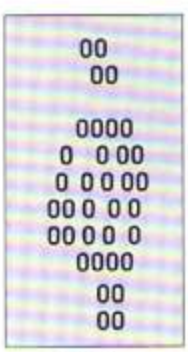
Glider



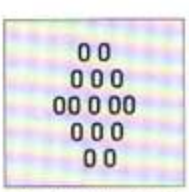
Spaceship



Galaxy



Clock



Omit bottom two cells for a different pattern

```
  10 REM Life
  20 REM By John Geraghty
  30 REM (c) Electron User
  40 :
  50 ON ERROR PROCerr
  60 IF PAGE>&E00 PROCreloc
  70 MODE2
  80 MODE5
  90 HIMEM=&3000
 100 PROCinit
 110 :
 120 REPEAT
 130 REPEAT
 140 CALL breed
 150 PROCinkeys
 160 UNTIL S%
 170 :
 180 REPEAT
 190 PROCinkeys
 200 UNTIL INKEY-99 OR NOT S%
 210 PROCnot_ink2(-99)
 220 UNTIL FALSE
 230 :
 240 DEF PROCinkeys
 250 IF INKEY-83 PROCtoggle_col
 260 IF INKEY-35 PROCedit
 270 IF INKEY-82 PROCtoggle_step
 280 ENDPROC
 290 :
 300 DEF PROCnot_ink(n%)
 310 VDU7
 320 DEF PROCnot_ink2(n%)
 330 REPEAT UNTIL NOT INKEYn%
 340 ENDPROC
 350 :
 360 DEF PROCinit
 370 PROCassemble
 380 FOR L%=0 TO 38
 390 ?(times8+L%)=L%*8
 400 NEXT
 410 *FX214,1
 420 *FX213,255
 430 *FX16
 440 VDU23,241,&E0,&E0,&E0;0;0;
 450 *FX9,1
 460 *FX10,1
 470 VDU19,0,4;0;
 480 VDU23,1,0;0;0;0;
 490 C%=TRUE
 500 S%=FALSE
 510 PROCedit
 520 PROCcolour
 530 ENDPROC
 540 :
 550 DEF PROCedit
 560 PROCnot_ink(-35)
 570 PRINTTAB(0,31)SPC(19);
 580 VDU19,2,7;0;19,1,4;0;
 590 PROCgrid(TRUE)
 600 VDU19,2,6;0;19,1,0;0;
 610 GCOL3,7
 620 X%=56:Y%=64
 630 PROCcross1
 640 PROCopt
 650 :
 660 REPEAT
 670 PRINTTAB(0,31);SPC(10);TAB(
0,31);"x:";(X%+8)DIV 32;TAB(5,31)
;"y:";(Y%-32)DIV 16;
 680 F%=0
 690 IF INKEY-83 PROCnot_ink(-83
):C%=NOT C%:PROCopt
 700 IF INKEY-82 PROCnot_ink(-82
):S%=NOT S%:PROCopt
 710 IF INKEY-74 MOVEX%+8,Y%+12:
VDU5,241,4:F%=32
 720 IF INKEY-35 F%=16
 730 IF INKEY-67 F%=F% OR 1
 740 IF INKEY-98 F%=F% OR 2
 750 IF INKEY-73 F%=F% OR 4
 760 IF INKEY-105F%=F% OR 8
 770 IF INKEY-74 IF F%=32 GOTO 7
30
 780 IF F%=0 OR F%=32 GOTO680
 790 oldx%=X%:oldy%=Y%
 800 IF F% AND 1 X%=X%+32:IF X%=
1272 X%=-8
 810 IF F% AND 2 X%=X%-32:IF X%=
-40 X%=1240
 820 IF F% AND 4 Y%=Y%+16:IF Y%=
1024 Y%=32
 830 IF F% AND 8 Y%=Y%-16:IF Y%=
16 Y%=1008
 840 PROCcross2
 850 IF INKEY-1 F%=0:GOTO730
 860 UNTIL F% AND 16
 870 PROCnot_ink(-35)
 880 PROCcross1
 890 PROCgrid(FALSE)
 900 PROCtitle
 910 PROCcolour
 920 !gen=1
 930 ENDPROC
 940 :
 950 DEF PROCcross2
 960 MOVEoldx%,32:DRAWoldx%,1023
 970 MOVE0,oldy%:DRAW1280,oldy%
 980 DEF PROCcross1
 990 MOVEX%,32:DRAWX%,1023
1000 MOVE0,Y%:DRAW1280,Y%
1010 ENDPROC
1020 :
1030 DEF PROCgrid(X%)
1040 !scr=&100*?&34E
1050 X%=-15*X%
1060 CALL grid
1070 ENDPROC
1080 :
1090 DEF PROCtoggle_col
1100 PROCnot_ink(-83)
1110 C%=NOT C%
1120 DEF PROCcolour
1130 IF C% VDU19,2,2;0;19,1,10;0
; ELSE VDU19,2,7;0;19,1,4;0;
1140 ENDPROC
1150 :
1160 DEF PROCtoggle_step
1170 PROCnot_ink(-82)
1180 S%=NOT S%
1190 ENDPROC
1200 :
1210 DEF PROCtitle
1220 GCOL0,7
1230 ?&34E=&68 EOR ?&34E:?&351=?
&34E
1240 PROCtitle2
1250 ?&34E=&68 EOR ?&34E:?&351=?
&34E
1260 DEF PROCtitle2
1270 MOVE0,32:DRAW1280,32
1280 PRINTTAB(0,31)"generation:"
;SPC(8);
1290 ENDPROC
1300 :
1310 DEF PROCopt
1320 PRINTTAB(11,31)SPC(8);
1330 COLOUR129:COLOUR2
1340 IF C% PRINTTAB(11,31)"Col";
1350 IF S% PRINTTAB(15,31)"Step"
;
1360 COLOUR128:COLOUR3
1370 ENDPROC
1380 :
1390 DEF PROCreloc
1400 OSCLI("KEY0 *TAPE|M F%=PAGE
:T%=&E00:?TOP=13:REPEAT $T%=$F%:L
%=LEN$T%+1:T%=T%+L%:F%=F%+L%:UNTI
L F%>TOP|M PAGE=&E00|M OLD|M RUN|
M")
1410 OSCLI("FX138,0,128"):END
1420 :
1430 DEF PROCerr
1440 ON ERROR OFF
1450 VDU22,6
1460 HIMEM=&6000
1470 *FX214,6
1480 *FX213,100
1490 REPORT:PRINT" at line ";ERL
1500 END
1510 :
1520 DEF PROCassemble
1530 REM &4F TO &9E used for dat
a; this and other locations below
 temporarily free
1540 count=&4F
1550 status=&77
1560 scr=&70
1570 top=&E0
1580 mid=&F5
1590 bot=&F7
1600 cell=&3B
1610 row=&F9
1620 col=&1C
1630 temp=&1D
1640 print_no=&991F
1650 oswrch=&FFEE
1660 :
1670 FOR pass=0 TO 2 STEP2
1680 P%=&A00
1690 [OPT pass
1700 .breed
1710 \SEI (for speed) only if no
 flashing colours
1720 BCS not_sei
1730 SEI
1740 .not_sei
1750 \set row index
1760 LDX #&3D
1770 STX row
1780 :
1790 \hi or lo screen?
1800 INC index
1810 LDA index
1820 AND #1
1830 BEQ hi_scr
1840 :
1850 \top, mid, bot point to sta
rt of screen rows to get count of
 on cells
1860 LDX #&84
1870 STX mid
1880 LDX #&56
1890 STX mid+1
1900 LDX #0
1910 STX bot
1920 LDX #&31
1930 STX bot+1
1940 \cell points to other scree
n for plotting
1950 LDX #&BC
1960 STX cell
1970 LDX #&57
1980 STX cell+1
1990 STX cell+3
2000 STX cell+5
2010 BNE do_row
2020 :
2030 .hi_scr
2040 LDX #&84
2050 STX mid
2060 LDX #&7E
2070 STX mid+1
2080 LDX #0
2090 STX bot
2100 LDX #&59
2110 STX bot+1
2120 LDX #&BC
2130 STX cell
2140 LDX #&2F
2150 STX cell+1
2160 STX cell+3
2170 STX cell+5
2180 :
2190 .do_row
2200 \mid becomes top, top becom
es bot, bot and cell incremented
```

```
2210 LDX mid
2220 STX top
2230 LDX mid+1
2240 STX top+1
2250 LDA bot
2260 STA mid
2270 LDA bot+1
2280 STA mid+1
2290 :
2300 LDA row
2310 AND #1
2320 BNE even
2330 :
2340 \odd row
2350 DEC cell+1
2360 DEC cell+3
2370 DEC cell+5
2380 LDA cell
2390 CLC
2400 ADC #4
2410 TAX
2420 STX cell
2430 INX
2440 STX cell+2
2450 INX
2460 STX cell+4
2470 :
2480 LDA row
2490 BEQ last_row
2500 LDA bot
2510 CLC
2520 ADC #&3C
2530 STA bot
2540 LDA bot+1
2550 ADC #1
2560 STA bot+1
2570 JMP not_last
2580 :
2590 .even
2600 LDA cell
2610 CLC
2620 ADC #&3C
2630 BCC notinc
2640 INC cell+1
2650 INC cell+3
2660 INC cell+5
2670 .notinc
2680 TAX
2690 STX cell
2700 INX
2710 STX cell+2
2720 INX
2730 STX cell+4
2740 :
2750 LDA bot
2760 CLC
2770 ADC #4
2780 STA bot
2790 BCC not_last
2800 :
2810 .last_row
2820 LDX #0
2830 STX bot
2840 LDX #&59
2850 STX bot+1
2860 LDA index
2870 AND #1
2880 BEQ not_last
2890 LDX #&31
2900 STX bot+1
2910 :
2920 .not_last
2930 \count holds sum of on
cells above+below target cell
2940 LDA #0
2950 STA count
2960 STA status
2970 STA count+1
2980 STA status+1
2990 :
3000 \count gets data for
extreme right cell, count+1
gets data for leftmost (for
wraparound)
3010 LDY #&38
3020 LDA (top),Y
3030 BPL over1
3040 INC count
3050 .over1
3060 LDA (mid),Y
3070 BPL over2
3080 INC status
3090 .over2
3100 LDA (bot),Y
3110 BPL over3
3120 INC count
3130 .over3
3140 DEC top+1
3150 DEC mid+1
3160 DEC bot+1
3170 LDY #0
3180 LDA (top),Y
3190 BPL over4
3200 INC count+1
3210 .over4
3220 LDA (mid),Y
3230 BPL over5
3240 INC status+1
3250 .over5
3260 LDA (bot),Y
3270 BPL over6
3280 INC count+1
3290 .over6
3300 \set column index
3310 LDA #&26
3320 STA col
3330 :
3340 LDA top
3350 STA over7+1
3360 LDA top+1
3370 STA over7+2
3380 LDA mid
3390 STA over8+1
3400 LDA mid+1
3410 STA over8+2
3420 LDA bot
3430 STA over9+1
3440 LDA bot+1
3450 STA over9+2
3460 :
3470 INC top+1
3480 INC mid+1
3490 INC bot+1
3500 LDX #1
3510 :
3520 .do_cell
3530 \8 bytes between cells
3540 LDY times8,X
3550 BNE hi_ok
3560 INC cell+1
3570 INC cell+3
3580 INC cell+5
3590 INC over7+2
3600 INC over8+2
3610 INC over9+2
3620 :
3630 .hi_ok
3640 INX
3650 LDA #0
3660 STA count,X
3670 STA status,X
3680 CLC
3690 :
3700 .over7
3710 LDA &FFFF,Y
3720 \colours 2 and 3
signify ON
3730 BPL over8
3740 INC count,X
3750 .over8
3760 LDA &FFFF,Y
3770 BPL over9
3780 INC status,X
3790 SEC
3800 .over9
3810 LDA &FFFF,Y
3820 BPL get_count
3830 INC count,X
3840 :
3850 .get_count
3860 LDA count,X
3870 ADC count-1,X
3880 ADC count-2,X
3890 ADC status-2,X
3900 :
3910 .on_or_off
3920 STA temp
3930 ORA status-1,X
3940 ORA (cell),Y
3950 BEQ cell_ok
3960 LDA temp
3970 BEQ turn_off
3980 CMP #2
3990 BCC turn_off
4000 BNE not_maintain
4010 LDA status-1,X
4020 BEQ plot_cell
4030 .maintain_on
4040 LDA #&EE
4050 BNE plot_cell
4060 :
4070 .not_maintain
4080 CMP #3
4090 BEQ turn_on
4100 .turn_off
4110 \if already off,
colour 0
4120 LDA status-1,X
4130 BEQ plot_cell
4140 \colour 1
4150 LDA #&0E
4160 BNE plot_cell
4170 .turn_on
4180 LDA status-1,X
4190 BNE maintain_on
4200 LDA #&E0
4210 :
4220 .plot_cell
4230 CMP (cell),Y
4240 BEQ cell_ok
4250 STA (cell),Y
4260 STA (cell+2),Y
4270 STA (cell+4),Y
4280 :
4290 .cell_ok
4300 DEC col
4310 BNE do_cell
4320 :
4330 \penultimate
cell
4340 CPY #&38
4350 BEQ last_cell
4360 BCS end_of_row
4370 INX
4380 INC col
4390 LDY #&38
4400 CLC
4410 LDA count+38
4420 ADC status+38
4430 ADC count+39
4440 ADC count
4450 ADC status
4460 BPL on_or_off
4470 :
4480 .last_cell
4490 LDX #1
4500 INC col
4510 LDY #&40
4520 CLC
4530 LDA count+39
4540 ADC status+39
4550 ADC count
4560 ADC count+1
4570 ADC status+1
4580 BPL on_or_off
4590 :
4600 .end_of_row
4610 DEC row
4620 BMI end_of_screen
4630 JMP do_row
4640 :
4650 .end_of_screen
4660 LDA index
4670 AND #1
4680 BNE hi_screen
4690 :
4700 LDA #&18
4710 LDX #&30
4720 BNE screen_paras
4730 :
4740 .hi_screen
4750 LDA #&2C
4760 LDX #&58
4770 .screen_paras
4780 STA &FE03
4790 STX &34E
4800 STX &351
4810 \print generation
number at TAB(12,31)
4820 LDA #31
4830 JSR oswrch
4840 LDA #12
4850 JSR oswrch
4860 LDA #31
4870 JSR oswrch
4880 LDA gen
4890 STA &2A
4900 LDA gen+1
4910 STA &2B
4920 JSR print_no
4930 :
4940 INC gen
4950 BNE cli
4960 INC gen+1
4970 .cli
4980 CLI
4990 RTS
5000 :
5010 .grid
5020 \grid for edit routine
5030 LDY #0
5040 .gloop
5050 TYA
5060 AND #3
5070 CMP #3
5080 BNE skip
5090 TXA
5100 JMP sta
5110 .skip
5120 LDA (scr),Y
5130 AND #&F0
5140 BEQ skip2
5150 LDA #&EE
5160 .skip2
5170 CPX #&0F
5180 ADC #0
5190 .sta
5200 STA (scr),Y
5210 CPY #&BF
5220 BNE gov
5230 LDA scr+1
5240 CMP #&7E
5250 BEQ cli
5260 CMP #&56
5270 BEQ cli
5280 .gov
5290 INY
5300 BNE gloop
5310 INC scr+1
5320 BPL gloop
5330 :
5340 .index
5350 EQUB &FF
5360 .gen
5370 EQUD 0
5380 .times8
5390 ]:NEXT:ENDPROC
```

Saving grace

Give your fingers a rest with Stephen Ramplin's utility – once you've typed it in, of course

WHETHER you are writing your own programs or tapping in a listing from *Electron User*, it is always a good idea to save your work frequently in case of power failure, program crashes and so on.

If you are developing a machine code game or utility it is even more important that you save every time you run and test the program. In an effort to cut down on typing, and to make program development slightly easier, Acorn introduced a new facility into Basic version IV, supplied with the BBC Master Compact. It allows you to put the filename into a REM statement at the start of a Basic program listing and from then on you can simply type SAVE to save it with that name.

The Electron has only version II of BBC Basic which lacks this facility. However, with Remsave – the short machine code utility presented here – you can upgrade your Basic and add this very useful facility provided you have an ADFS or DFS disc system.

All you have to do is to type in and save the program to disc in the normal way. Then run Remsave to create a small machine code program on disc. ADFS users can put this file, called RS, into the $.LIBRARY directory, then it is instantly available no matter which directory you are currently in.

To install it into memory run either the Basic listing or the machine code file with *RS. Now it is ready to use. When you are next typing in a program listing start off by putting the filename in a REM statement in the first line like this:

```
10 REM >INVADER
```

When you want to save the program with the name INVADER just type *RS. The filename must follow the greater-than symbol and obey the normal rules for filenames. The utility generates an error message if it can't find the filename in the first line, or if the name is too long.

The utility works by intercepting the oscli vector to add the command to the ones already built in. When called, it responds by taking the filename from the REM statement and initiating a save routine using osfile.

```
10 REM >REMSAVE
20 REM By Stephen Ramplin
30 REM (c) Electron User
40 string = &80
50 oldv = &82
60 tmp = &84
70 oscli = &208
80 osfile = &FFDD
90 page = &18
100 top = &12
110 FOR n = 0 TO 3 STEP 3
120 P% = &C00
130 [ OPT n
140 .init LDA oscli
150 LDX oscli+1
160 CMP #ncliv MOD 256
170 BNE change
180 CPX #ncliv DIV 256
190 BEQ done
200 .change
210 STA oldv
220 STX oldv+1
230 SEI
240 LDA #ncliv MOD 256
250 STA oscli
260 LDA #ncliv DIV 256
270 STA oscli+1
280 CLI
290 .done
300 RTS
310 .ncliv
320 PHP
330 PHA
340 STX string
350 STY string+1
360 LDY #1
370 .loop1
380 LDA (string),Y
390 AND #&DF
400 CMP remsave,Y
410 BNE not
420 INY
430 CPY #3
440 BNE loop1
450 LDA page
460 STA tmp+1
470 LDA #4
480 STA tmp
490 LDY #0
500 .loop2
510 LDA (tmp),Y
520 INC tmp
530 CMP #ASC">"
540 BEQ over1
550 CMP #&0D
560 BEQ error1
570 JMP loop2
580 .over1
590 LDA (tmp),Y
600 CMP #32
610 BNE over2
620 INC tmp
630 JMP over1
640 .over2
650 STA name,Y
660 INY
670 CPY #9
680 BEQ error2
690 CMP #&0D
700 BNE over1
710 LDA page
720 STA block+3
730 STA block+11
740 LDA top
750 STA block+14
760 LDA top+1
770 STA block+15
780 LDX #block MOD 256
790 LDY #block DIV 256
800 LDA #0
810 JSR osfile
820 .end
830 LDX string
840 LDY string+1
850 PLA
860 PLP
870 RTS
880 .not
890 LDX string
900 LDY string+1
910 PLA
920 PLP
930 JMP (oldv)
940 .error1
950 BRK
960 EQUB 0
970 EQUS "Filename indicator (>
    ) absent"
980 BRK
990 .error2
1000 BRK
1010 EQUB 0
1020 EQUS "Filename too long"
1030 BRK
1040 .remsave
1050 EQUS "*RS"
1060 EQUB &0D
1070 .name
1080 EQUS STRING$(11,CHR$0)
1090 .block
1100 EQUW name
1110 EQUD 0
1120 EQUD &8023
1130 EQUD 0
1140 EQUD 0
1150 ]
1160 NEXT
1170 CALL init
1180 OSCLI"SAVE RS C00 "+STR$~P%
```

Talking turtle

Try Timothy Grantham's fast logo and turtle graphics interpreter

LOGO is a fairly new language, less than 15 years old. It was developed by Seymour Papert, a mathematics professor at the Massachusetts Institute of Technology. He investigated how children learn and how computers could help them. Logo was intended to provide the ideal learning environment.

It has been, and still is, widely used in schools, particularly in primary education where children are taught simple geometry through using a turtle or buggy combined with Logo's simple graphics commands.

Unfortunately, the educational history of Logo's development has had the effect of labelling the language as a child's toy. Most people are aware only of the turtle graphics side of the language, and this tends to strengthen the misaprehension.

It is far from being a toy and is in fact a powerful programming language which has many applications. With the exception of turtle graphics, Logo is far from easy to learn and is probably more difficult to get to grips with than Basic.

To provide a gentle introduction to this fascinating language here is a simple turtle graphics interpreter written in just a few k of Basic. The table below lists the commands the interpreter understands.

To get you started writing Logo programs there is a demonstration built in to the program. Run the program and press function key 1 – Caps Lk/Func+1 – to draw a picture. Here is a short procedure to draw a square:

```
CLEARSCREEN
FORWARD 100
LEFT 90
FORWARD 100
LEFT 90
FORWARD 100
LEFT 90
FORWARD 100
LEFT 90
```

It can be written in a more compact form using the REPEAT command like this:

```
CLEARSCREEN
REPEAT 4 [FD 100 LT 90]
```

Simple, isn't it? Can you draw a triangle instead? Or a star shape? Experiment and have fun.

Abreviation	Command	Effect
CS	CLEARSCREEN	Clear the screen
CAT	CAT	Catalogue disc or tape
FD	FORWARD num	Move forward
BK	BACK num	Move back
RT	RIGHT num	Turn right
LT	LEFT num	Turn left
OSCLI	OSCLI command	Operating system command
KEY	KEY num,command	Define a function key
HT	HIDETURTLE	Hide the turtle
ST	SHOWTURTLE	Show the turtle
PU	PENUP	Lift the pen up
PD	PENDOWN	Put the pen down
CIRCLE	CIRCLE num	Draw a circle
OVEL	OVEL num,num	Draw an ellipse
SETPC	SETPENCOLOUR num	Set pen colour
NEW	NEW	Insert a new ADFS disc
SAVE	SAVE "string	Save the screen
LOAD	LOAD "string	Load the screen
PRINT	PRINT "string	Print a string
CL	CLEAN	Clear the screen
HOME	HOME	Send the turtle to home position
CT	CLEARTEXT	Clear the text window
REPEAT	REPEAT num	Repeat instructions in [...]
FILL	FILL	Fill the shape with colour
TEXT	TEXT "string	Print text at turtle position

The turtle graphics

```
  10 REM Save Before Running
  20 REM ********************
  30 REM *       LOGO +       *
  40 REM * BY T.J. Grantham *
  50 REM *(c) ELECTRON USER *
  60 REM ********************
  70 *KEY 1,PU|MHT|MCIRCLE 100|M
FILL|MCIRCLE 200|MFD 150|MSETPC 1
|MFILL|MBK 300|MFILL|MFD 150|MRT
90|MFD 150|MFILL|MBK 300|MFILL|MF
D 150|MHOME|MSETPC 3|MOVAL 200,30
0|MFD 250|MSETPC 2|MFILL|MBK 500|
MFILL|MHOME|MPD|M
  80 MODE 1
  90 COLOUR 129:CLS
 100 VDU28,0,31,39,26,12
 110 VDU24,&C;&C4;&4F3;&3F7;
 120 CLG
 130 VDU 23,124,28,28,28,28,28,2
8,28,0
 140 COLOUR 129:CLS
 150 X=640:Y=608:0X=X:0Y=Y
 160 RX=0:colX=7:noturtX=FALSE:n
openX=FALSE
 170 PRINT"Welcome to Logo +"'"B
Y T.J.Grantham"'"(C) Electron Use
r 1990"'"Press A Key"
 180 A=GET
 190 CLS:PRINT"Logo +BY T.J.Gra
ntham(C) Electron User"
 200 VDU28,0,31,39,27,12
 210 COLOUR 128:CLS
 220 MOVEX%,Y%:PROCturtle
 230 ONERRORPROCerr
 240 REPEAT typeX=0
 250 REPEATINPUTLINE,COM$:UNTILC
OM$<>"":COM$=FNcase(COM$)
 260 S$="FN"+FNsymb
 270 IFFNabort UNTIL.
 280 Q%=EVAL(S$)
 290 PROCpen
 300 PROCturtle
 310 UNTIL.
 320 DEFPROCskip :IFASCCOM$=32RE
PEATCOM$=MID$(COM$,2):UNTILASCCOM
$<>32:ENDPROC
 330 ENDPROC
 340 DEFFNsymb:LOCAL L$
 350 PROCskip
 360 S%=INSTR(COM$," ")
 370 IFS%=0THEN typeX=1:L$=COM$:
COM$="":parmX=0:=L$
 380 L$=LEFT$(COM$,S%-1)
 390 COM$=MID$(COM$,S%+1)
 400 PROCskip
 410 parmX=VALCOM$
 420 IFASCCOM$<=ASC"9"ORASCCOM$>
=ASC"0" REPEATCOM$=MID$(COM$,2):U
NTILASCCOM$>ASC"9"ORASCCOM$<ASC"0
"
 430 DEFFNCLEARSCREEN:=FNCS
 440 typeX=2:=L$
 450 DEFFNCAT:*.
 460 PROCturtle:=0
 470 DEFFNFD:PROCturtle:PROCforw
ard(parmX):=0
 480 DEFFNFORWARD:=FNFD
 490 DEFFNBK:PROCturtle:PROCforw
ard(-parmX):=0
 500 DEFFNBACK:=FNBK
 510 DEFFNRT:PROCturtle:PROCturn
(parmX):=0
 520 DEFFNRIGHT:=FNRT
 530 DEFFNLT:PROCturtle:PROCturn
(-parmX):=0
 540 DEFFNLEFT:=FNLT
 550 DEFFNOSCLI:PROCturtle
 560 OSCLI COM$
 570 =0
 580 DEFFNHT:PROCturtle:noturtX=
TRUE:=0
 590 DEFFNKEY:K$=STR$(parmX):COD
E$=COM$
 600 O$="KEY "+K$+" "+CODE$:OSCL
I O$:PROCturtle:=0
 610 DEFFNHIDETURTLE:=FNHT
 620 DEFFNST:PROCturtle:noturtX=
FALSE:=0
 630 DEFFNSHOWTURTLE:=FNST
 640 DEFFNTURTLE:=0
 650 DEFFNTURT=0
 660 DEFFNPU:PROCturtle:nopenX=T
RUE:=0
 670 DEFFNPENUP:=FNPU
 680 DEFFNPD:PROCturtle:nopenX=F
ALSE:=0
 690 DEFFNPENDOWN:=FNPD
 700 DEFFNCI:=FNCIRCLE
 710 DEFFNCIRCLE:PROCturtle:MOVE
 X,Y+parmX:FOR A=0 TO 6.3 STEP .1
:DRAW X+parmX*SIN(A),Y+parmX*COS(
A):NEXT A:=0
 720 DEFFNOVAL:WWX=parmX:CH=LENC
OM$:PROCturtle:CH=CH-1:parm2X=VAL
(RIGHT$(COM$,CH)):MOVE X,Y+parm2X
:FOR A=0 TO 6.3 STEP .1:DRAW X+WW
X*SIN(A),Y+parm2X*COS(A):NEXT A:=
0
 730 DEFFNOV:=FNOVEL
 740 DEFFNSETPC:PROCturtle:colX=
parmXAND7:=0
 750 DEFFNSETPENCOLOUR:=FNPC
 760 DEFFNNEW:*MOUNT
 770 *DIR
 780 PROCturtle:=0
 790 DEFFNSAVE:PROCturtle:OSCLI
"SAVE "+COM$+" 3000 7100":=0
 800 DEFFNLOAD:PROCturtle:OSCLI
"LOAD "+COM$:=0
 810
 820
 830 DEFFNPRINT:PROCturtle:FOR N
=1 TO parmX :PRINT COM$:NEXTN:=0
 840 DEFFNP:=FNPRINT
 850 DEFFNCL:PROCturtle:CLG:=0
 860 DEFFNCLEAN:=FNCL
 870 DEFFNHOME:PROCturtle:X=640:
Y=608:RX=0:=0
 880 DEFFNCS:PROCturtle:noturtX=
FALSE:X=640:Y=608:RX=0:CLG:MOVE X
,Y:=0
 890 DEFFNCT:PROCturtle:CLS:=0
 900 DEFFNCLEARTEXT:=FNCT
 910 DEFFNREPEAT:LOCALI%,timesX,
REP$:timesX=parmX:IFtimesX<1:PRIN
T"REPEAT must be done at least on
ce":PROCturtle:=0
 920 S%=INSTR(COM$,"[")
 930 IFS%=0PRINT"REPEAT must be
followed by a number and"'"then,
in brackets, a list of commands."
'"e.g. REPEAT 4 [FORWARD 100 RIGH
T 90 ]":PROCturtle:=0
 940 COM$=MID$(COM$,S%+1):REP$=C
OM$
 950 FORI%=1TOtimesX
 960 COM$=REP$
 970 S$="FN"+FNsymb
 980 IFFNabort:PROCturtle:=0
 990 Q%=EVAL(S$)
1000 PROCpen
1010 PROCturtle
1020 PROCskip
1030 IFASCCOM$=ASC"]" NEXT:COM$=
MID$(COM$,2):PROCturtle:=0
1040 GOTO970
1050 DEFFNcase(A$)LOCALI%,B$,chX
1060 FORIX=1TOLENA$
1070 chX=ASCMID$(A$,I%)
1080 IFchX>=ASC"a"ANDchX<=ASC"z"
chX=chX-32
1090 B$=B$+CHR$chX:NEXT:=B$
1100 DEFPROCerr
1110 IFERR=17GOTO1350
1120 IFERR=29PRINT"I don't know
how to "MID$(S$,3):ENDPROC
1130 PRINT"I have an error the c
ode is ";ERR;CHR$(11):REPORT:PRIN
T" Is the error"
1140 ENDPROC
1150 DEFPROCturn(DX)
1160 RX=(RX+DX) MOD 360
1170 ENDPROC
1180 DEFPROCforward(DX)
1190 X=INT(X+DX*SINRADRX+0.5)
1200 Y=INT(Y+DX*COSRADRX+0.5)
1210 ENDPROC
1220 DEFPROCturtle
1230 LOCALx,y:x=X:y=Y
1240 IFnoturtX ELSE:GCOL3,colX:M
OVEX+48*SINRADRX,Y+48*COSRADRX:MO
VEX-12*COSRADRX,Y+12*SINRADRX:PLO
T85,X+12*COSRADRX,Y-12*SINRADRX
1250 GCOL0,colX:MOVEx,y:MOVEx,y:
ENDPROC
1260 DEFPROCpen
1270 IFX<>0X OR Y<>0Y PROCmovepe
n
1280 0X=X:0Y=Y:ENDPROC
1290 DEFPROCmovepen
1300 IFnopenX MOVE X,Y ELSE DRAW
 X,Y
1310 ENDPROC
1320 DEFFNabort
1330 IFINKEY(-2)THENPRINT"Interr
upted in : "COM$:=TRUE
1340 =FALSE
1350 REM ESCAPE WAS PRESSED
1360 PRINT '"STOPPED!!!"
1370 ENDPROC
1380 DEF FNFILL
1390 PROCturtle
1400 GCOL 0,colX
1410 UPX=4
1420 I3X=X:J3X=Y
1430 REPEAT
1440 PLOT 77,I3X,J3X
1450 J3X=J3X+UPX
1460 UNTIL POINT(I3X,J3X) OR J3X
>&400
1470 GI3X=X:J3X=Y
1480 REPEAT
1490 PLOT 77,I3X,J3X
1500 J3X=J3X-UPX
1510 UNTIL POINT(I3X,J3X) OR J3X
<&C0
1520 =0
1530 DEFFNHELP
1540 PROCturtle
1550 PRINT "FILL,FD,RT,LT,BK,PU,
PD,CIRCLE,OVAL,HOME"
1560 PRINT "SAVE,LOAD,ST,HT,CAT,
NEW,OSCLI,PRINT,TEXTTURTLE"
1570 =0
1580 DEF FNTEXT
1590 PROCturtle
1600 VDU 5
```

TIME WARP 1984

Barry Woods time travels back to the Electron's early days

HERE we are in the 1990s, and it's almost the end of the century. Can you remember what you were doing way back in February 1984? Those were the early boom years of home computing, with micros like the Sinclair Spectrum, Commodore Vic 20, Oric, Jupiter Ace, Dragon and, of course, the Electron.

Few micros have lasted, but the Electron is the exception – it is still going almost as strongly as ever, with a thriving userbase and innovative companies like Pres supplying excellent peripherals.

Exactly six years ago this month *Electron User* was launched as a stand-alone magazine. Previously it had been a pull-out section in *The Micro User*, but due to popular demand from its readers it was decided to go it alone.

Way back then, the magazine was squarely aimed at a fairly young readership, with cartoon characters like Electron Eddy and Micro Kid very much in evidence. They soon built up a cult following and it was quite some time before they were dropped in favour of a more serious magazine format.

Other features designed to appeal to the younger reader and novice user were Sounds Exciting, a library of interesting sound effects, and Casting Agency, a library of user defined characters. The idea was that you could incorporate these handy little routines into your own program listings. Both were very popular, and we have reproduced a couple of the best ones here.

The lead news story of the February 1984 issue speculated on a new hardware add-on module from Acorn. It was rumoured to have an analogue to digital interface which could be used for joysticks, a Centronics parallel interface for connecting a printer and two sideways rom sockets.

We now know the expansion module as the familiar Plus 1 – and the rumours were correct in every respect.

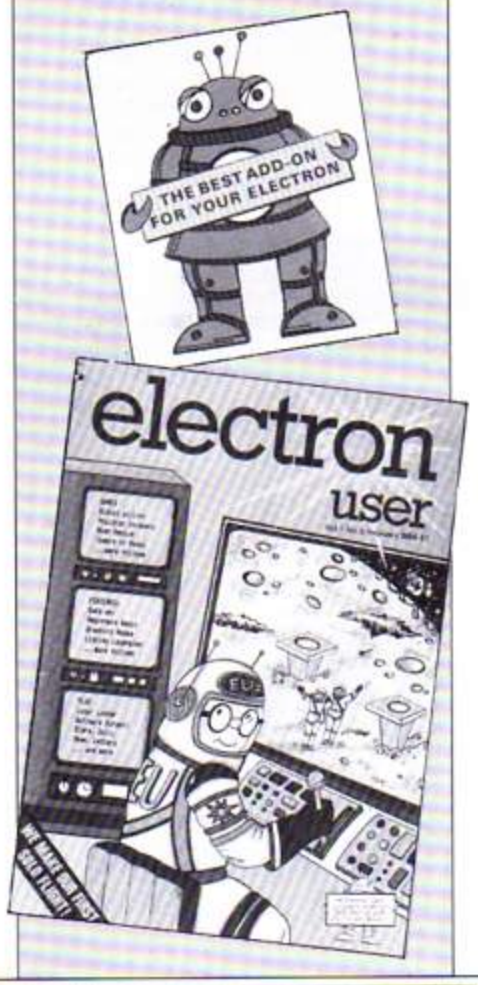
Software companies were ramping up production of games titles for the new Electron; Acornsoft already had 12 titles on offer and Micro Power had 10. The race to produce the first hardware add-on was won by Solidisk of Southend which demonstrated its GPI general purpose interface at the BBC Micro User Show.

The add-on plugged directly into the back of the Electron and provided sideways rom sockets, a printer port, a user port and Atari type joystick port. Unfortunately, Solidisk didn't have a great deal of success with the Electron and no longer produce peripherals for it.

Electron User features included the first part of Pete Bibby's long running Introduction to Programming and Trevor Roberts' article looked at the Electron's keyboard and explained what each key did – how on Earth did he make that topic stretch to two and a half pages?

Lunar Lander, Towers of Hanoi and Rescue the Moon Explorers were three simple type-in games, and there were plenty of short utilities and interesting graphics demonstrations too. No shortage of things to do for idle fingers here.

● *Next month it's March and I'll be setting the controls of my time machine for 1985. What chart-topping business program had just been released for the Electron? What was the tremendous news from Acorn? And will Pete Bibby manage to get on to PRINT statements by Part 14 of his Introduction to Programming. Wait and see...*



Sounds Exciting:

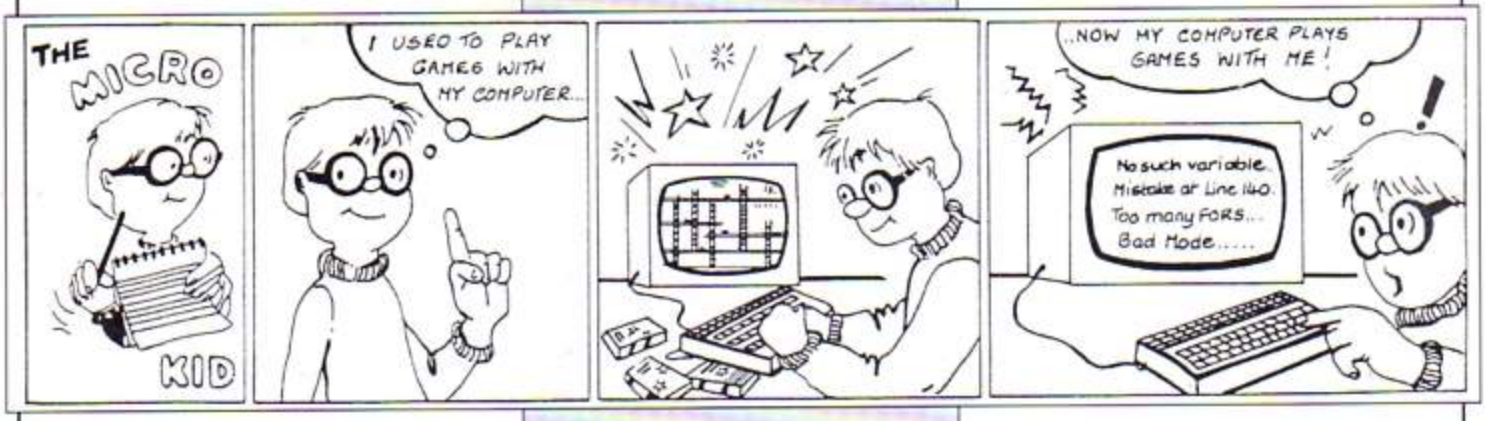
Phaser fire

```
10 ENVELOPE 1,3,-17,61,9,4,0,0
,126,0,0,-126,126,126
20 SOUND 1,1,157,129
```

Casting Agency:

A ship

```
10 VDU 23,237,4,6,13,12,20,36,
68,255
20 VDU 23,238,0,0,0,128,64,32,
16,240
30 VDU 23,239,0,3,2,1,0,0,0,0
40 VDU 23,240,4,255,0,0,170,85
,0,0
50 VDU 32,237,238,10,8,8,8,239
,240,241
```



DISCS – Everything you need to know...

Anatomy of a disc drive

Mike Cook offers a guided tour of a disc drive's inner regions

I AM frequently asked which is the best disc drive and I always answer that they are all the same so buy the best you can. And while that advice may be a little vague, it's probably the best you'll get.

There are many disc drive manufacturers and even more companies produce "own label" units. To make matters worse the latter are often from different manufacturers at different times.

All drives perform the same task and if one works at all, it works as well as any other – such is the nature of digital electronics.

However, the many individual components can be designed in a number of different ways, so let's have a look inside a disc drive.

The function of a drive is simply to record and retrieve data. To do this the disc has to be made to spin.

The spinning motor can move the disc by belt or direct drive, the former being used on the earlier disc drives.

But today it is possible to make small powerful motors to drive the pulleys directly. This has the advantage of taking up less space and, normally, less current that the older method.

Somewhere on the pulley or motor there is usually a paper disc with two rings of black lines.

These are strobe discs used for setting the speed of the motors. When the motor is running correctly and you view the rings under a flashing light, the lines appear to "stand still" when one light flashes at 50Hz and the other at 60Hz.

These are the two frequencies used for mains transmission throughout the world and so the source of flashing light can be simply an ordinary fluorescent lamp. There is usually a potentiometer on the logic board for adjusting the speed of the motor.

Once the disc is spinning, the read/write head must be positioned on the correct track.

This is normally done with a stepping motor, but the mechanism for transferring rotary motion to head movement can differ.

Traditionally this is done by having the head attached to a helical screw and as he screw turns the head moves across the disc.

Alternatively the head may be attached to a spring strip which the motor then winds and unwinds to make the head move, or it can be moved using a rack and pinion mechanism.

Whichever method is employed, the details of the design determine the rate at which the head can be moved reliably and this is known as the stepping rate. The head movement motor receives a pulse to move the head from one track to another, but when it is first switched on there is no way of telling which track it is resting at.

Therefore there is some sort of detector that signals when the head is at track zero. This is normally a micro-switch tripped by a small lever attached to the head. Alternatively this action may be performed by the lever breaking a light beam.

On an early computer of mine the heads could sometimes be stepped back past the point where the track zero switch was tripped. Consequently the drive would not correctly obey the operating system.

Fortunately I have not heard of this happening on the Electron.

When the head is moved to the correct position it is loaded – that is it is brought into contact with the disc. This is done by an electro-magnet pulling the head towards the drive.

And there is usually a mechanical override that unloads the head whenever the drive button is pressed, although some drives have the head permanently loaded to save time.

The operation of head loading can vary from drive to drive and it is known surprisingly enough, as the head load time.

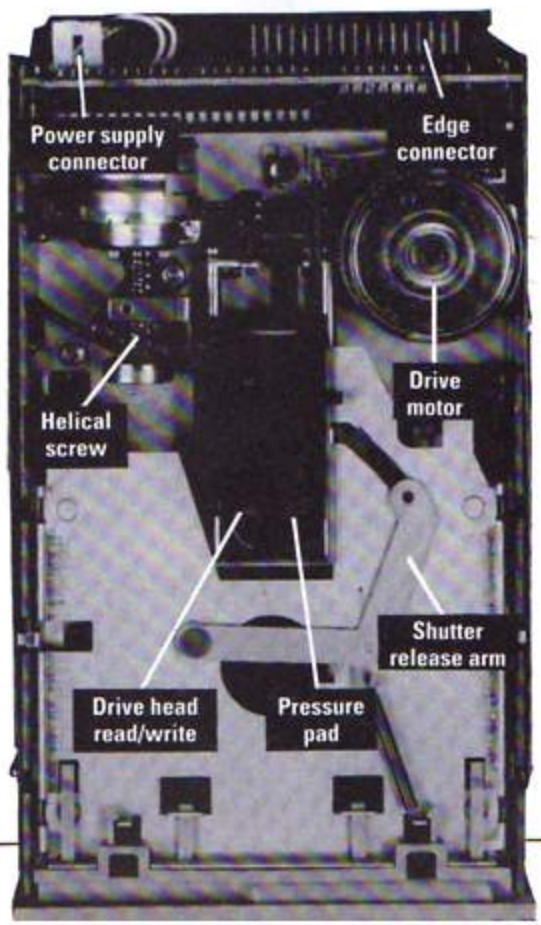
The start of each revolution of the disc is marked by a pulse given by a magnetic device on the drive wheel. The pulses may also be used by diagnostic software to determine the speed of the drive instead of using the stroboscopic method.

A write protect notch on the disc indicates a disc should not be altered. This can be sensed by the drive either using a micro switch or light beam.

The electronics board contains all the components to make the drive function. Drives are always connected to a computer along a bus which means that all connections go to all drives. In order to send information to only a single drive, three wires indicating the selected drive are included in the bus.

And somewhere on the electronics board is a set of links or switches to select just one of these lines.

So there you have it - the disc drive dissected. Have a peek inside yours and see if you can identify its major components.



DISCS – Everything you need to know...

THE Electron's disc drives are generally very reliable, and you are likely to have many years trouble-free computing. However, the Plus 3 was introduced around five years ago, if you were one of the first in the queue to buy one your drive will be around five years old.

Have you noticed a slight, but progressive deterioration in read/write reliability when saving or loading data from disc? It could simply be a build up of dirt on the read/write head, particularly if you operate your micro in a dusty environment. Give your drive's head a spring clean and you'll be operating at 100 per cent reliability again.

However, disc drives are complex mechanisms containing sophisicated electronic and mechanical components which require careful handling. So inexperienced users should consider enlisting professional help.

If you are having problems with a disc or drive the first task should always be to try the drive with several discs to eliminate the possibility of a faulty disc. If they all exhibit the same fault then there must be a problem with the drive itself. Next task is to replace the drive with one that you know works well. With a single drive system you could swap drives with a friend. It is a fairly straightforward procedure that simply involves unscrewing the micro's case and unplugging the old drive from its connecting cables and plugging the new one in. With a twin drive system you could swap the drives around.

If the micro works properly with the replacement drive the fault definitely lies with the

Disc delving

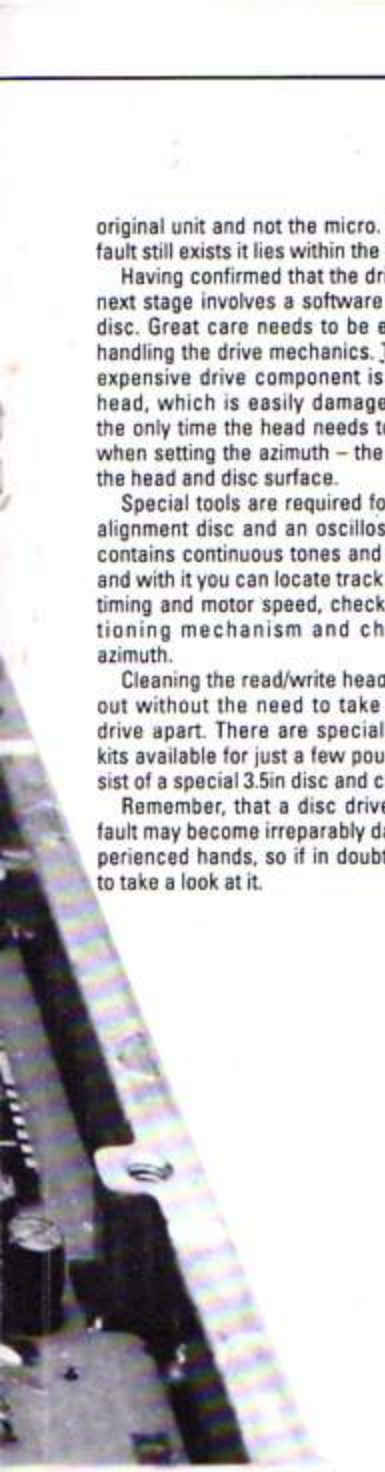
original unit and not the micro. However, if the fault still exists it lies within the micro.

Having confirmed that the drive is faulty, the next stage involves a software diagnostic test disc. Great care needs to be exercised when handling the drive mechanics. The single most expensive drive component is the read/write head, which is easily damaged. Fortunately, the only time the head needs to be touched is when setting the azimuth – the angle between the head and disc surface.

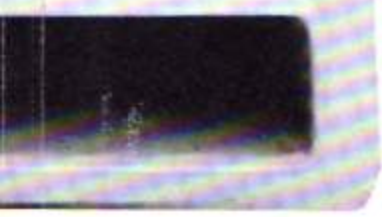
Special tools are required for this task – an alignment disc and an oscilloscope. The disc contains continuous tones and bursts of tones and with it you can locate track zero, adjust the timing and motor speed, check the head positioning mechanism and check the head azimuth.

Cleaning the read/write head can be carried out without the need to take your Plus 3 or drive apart. There are special head cleaning kits available for just a few pounds which consist of a special 3.5in disc and cleaning fluid.

Remember, that a disc drive with a simple fault may become irreparably damaged in inexperienced hands, so if in doubt, ask an expert to take a look at it.



Roland Waddilove offers help in locating and solving disc drive problems



YOUR TROUBLE SHOOTING GUIDE

FAULT: Drive motor not turning

Cause	Remedy
Faulty power supply	Check supply
Faulty cable or connector	Check for DC at appropriate points
Faulty speed regulator	Check regulator
Faulty motor	Replace motor

FAULT: Motor turning but disc not moving

Cause	Remedy
Drive belt broken or worn	Replace belt
Faulty head load bail arm	Adjust or replace

FAULT: No read or write

Cause	Remedy
Power supply failure	Check supply and regulators
Head not loading	Check head load mechanism Check disc bus pin 4
Head not stepping	Check stepper motor and disc bus pin 20
Faulty read amplifier	Check read amp and pin 30
Drive not selected	Check drive select lines
Dirty read/write head	Clean or replace head
Faulty pressure pad assembly	Check pad and replace

FAULT: Read, but no write

Cause	Remedy
Disc write protected	Close write protect hole
Faulty write protect circuit	Check write protect LED and photo detector
Faulty write amplifier	Check write signal at head
Faulty disc controller	Check disc bus pin 20

FAULT: Can't read discs from other micros

Cause	Remedy
Wrong speed	Adjust motor speed
Wrong disc format	Drive/DOS incompatible

FAULT: Intermittent errors

Cause	Remedy
Irregular speed	Check motor speed regulator
Worn drive belt	Replace belt
Worn pressure pad	Replace pad
Faulty flywheel	Check for too much play
Dirty read/write head	Clean or replace head

FAULT: Gradual deterioration

Cause	Remedy
Dirty read/write head	Clean head
Worn read/write head	Replace
Head mis-alligned	Adjust head azimuth
Worn head carriage	Adjust or replace
Insuficient head pressure	Adjust pressure pad
Wrong speed	Check motor speed

FAULT: Disc damaged

Cause	Remedy
Excesive head pressure	Adjust pressure pad
Worn head	Replace
Something lodged in pad	Replace pressure pad

FAULT: Errors with particular discs

Cause	Remedy
Inconsistent magnetic oxide	Replace disc
Friction between disc/case	Replace disc

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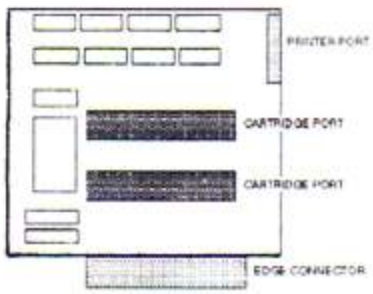

FRONT
(FULL Board shown)

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DISCS – Everything you need to know...

Double trouble

Should you buy double or single sided discs? Steve Evans explains the difference

YOU may have wondered what the difference is between a single and a double sided disc. Well, the fact is that all manufacturers aim to produce double sided, double density discs. It is only after production that their products are tested to see which category they fall into. If they fail the strict double sided test they are classed as single sided.

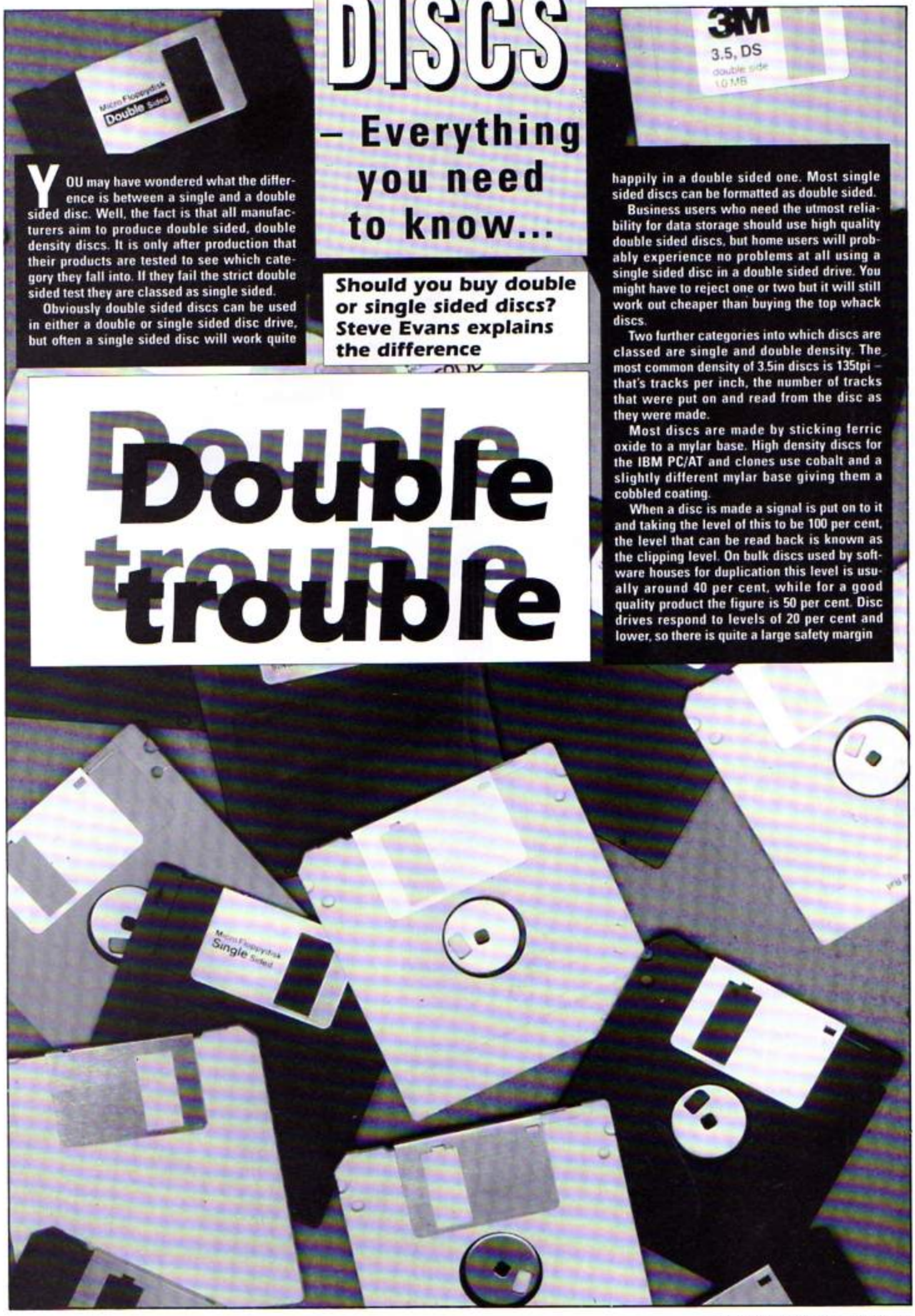
Obviously double sided discs can be used in either a double or single sided disc drive, but often a single sided disc will work quite happily in a double sided one. Most single sided discs can be formatted as double sided.

Business users who need the utmost reliability for data storage should use high quality double sided discs, but home users will probably experience no problems at all using a single sided disc in a double sided drive. You might have to reject one or two but it will still work out cheaper than buying the top whack discs.

Two further categories into which discs are classed are single and double density. The most common density of 3.5in discs is 135tpi – that's tracks per inch, the number of tracks that were put on and read from the disc as they were made.

Most discs are made by sticking ferric oxide to a mylar base. High density discs for the IBM PC/AT and clones use cobalt and a slightly different mylar base giving them a cobbled coating.

When a disc is made a signal is put on to it and taking the level of this to be 100 per cent, the level that can be read back is known as the clipping level. On bulk discs used by software houses for duplication this level is usually around 40 per cent, while for a good quality product the figure is 50 per cent. Disc drives respond to levels of 20 per cent and lower, so there is quite a large safety margin



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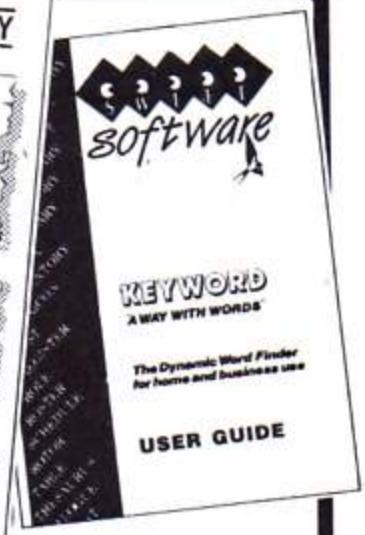
– *New Computer Express*



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Tank Attack is a computerised board game for two, three or four players, where each one takes the role of a General commanding a country's Tank Corps of one or more armoured divisions.

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Tank Attack

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Create your own fireworks display with Andrew Sage's utility

Bonfire night bonanza

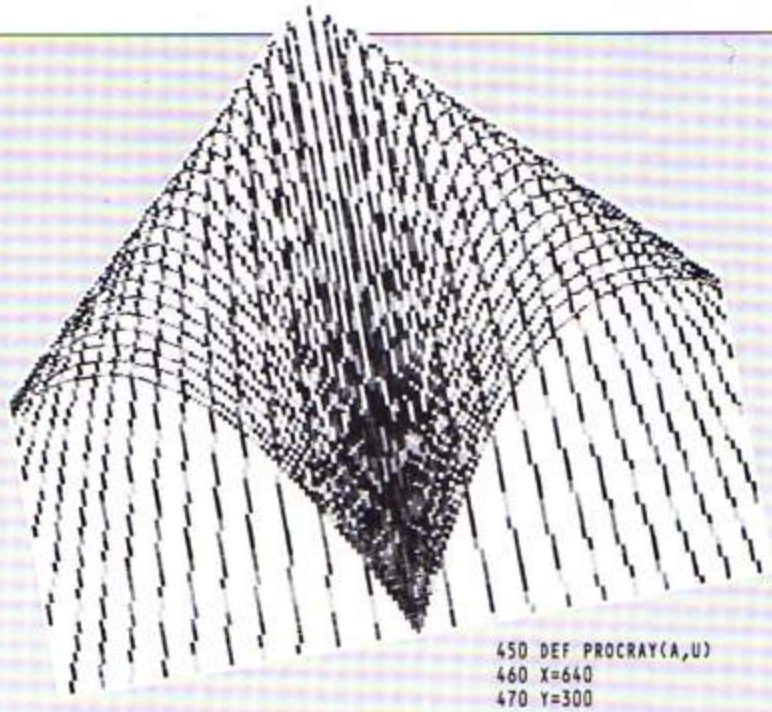
NOVEMBER the 5th is still a long way off, but with last year's spectacular fireworks displays still fresh in my mind I decided to recreate a special computerised version that I could watch at any time on the Electron.

To achieve the fast moving graphic display the traces of the fireworks are drawn onscreen and are then animated using a quick yet simple palette switching technique. Timing is critical, so if you have a Slogger Turbo you'll have to switch it off as you won't see the full effect of the fireworks.

A number of parameters have to be input each time the program is run, and it is from these that the firework display is constructed. The parameters are:

Up vel: The speed at which the fireworks first move up the screen.
Across vel: The speed at which the fireworks spread across the screen..
Length: The number of sections in each firework trace.
Gravity: The rate at which the fireworks are pulled down.
Up vel. dec: The amount by which successive fireworks reduce their height.
No. of rays: The number of fireworks on each side of the display.
Colour change: Whether or not the display changes colour when it is animated.

All these parameters may at first appear quite confusing, so six examples are built in to the program. When the first prompt appears press a function key in the range one to six.



```
   10 REM Fireworks
   20 REM By Andrew Sage
   30 REM (c) Electron User
   40 *KEY1 46|M.8|M200|M1|M.7|M2
0|MY|M
   50 *KEY2 60|M1|M50|M1|M1.1|M15
|MN|M|
   60 *KEY3 50|M1|M100|M2.5|M1|M1
0|MN|M
   70 *KEY4 15|M1|M150|M0.4|M1|M1
3|MY|M
   80 *KEY5 40|M1|M50|M1|M2|M12|M
N|M|
   90 *KEY6 80|M2|M100|M4|M2|M14|
MY|M
  100 A=RND(-TIME)
  110 MODE 6
  120 INPUT TAB(0,5);"Up Velocity
 (1-200)";UV
  130 INPUT TAB(0,7);"Across Velo
city Increase (.1 - 5)";AC
  140 INPUT TAB(0,9);"Length of r
ay (5-50)";LE
  150 INPUT TAB(0,11);"Gravity (.
1-10)";GR
  160 INPUT TAB(0,13);"Up velocit
y decrease (0-50)";GR1
  170 INPUT TAB(0,15);"No. of Ray
s (5-200)";NR
  180 INPUT TAB(0,17);"Colour Cha
nge (Y/N)";CO$
  190 MODE 2
  200 N=0
  210 U=UV
  220 A=0
  230 REPEAT
  240 PROCRAY(A,U)
  250 A=A+AC
  260 U=U-GR1
  270 N=N+1
  280 UNTIL N>NR
  290 N=0
  300 U=UV
  310 A=0
  320 REPEAT
  330 PROCRAY(A,U)
  340 A=A-AC
  350 U=U-GR1
  360 N=N+1
  370 UNTIL N>NR
  380 C=2
  390 REPEAT
  400 IF C=1 VDU 19,15,0;0; ELSE
VDU 19,C-1,0;0;
  410 IF CO$="Y" VDU 19,C,RND(7);
0; ELSE VDU 19,C,3;0;
  420 C=C+1
  430 IF C=16 C=1
  440 UNTIL 0
  450 DEF PROCRAY(A,U)
  460 X=640
  470 Y=300
  480 Y=0
  490 MOVE X,Y
  500 C=RND(15)
  510 CO%=0
  520 REPEAT
  530 X=X+A
  540 U=U-GR
  550 Y=Y+U
  560 C=C+1
  570 IF C=16 C=1
  580 GCOL 0,C
  590 DRAW X,Y
  600 CO%=CO%+1
  610 UNTIL CO%>=LE OR X>1279 OR
 X<0 OR Y<0
  620 ENDPROC
```

Memory master

Lost your memory? Find out where it has gone with Stephen Wade's handy programming aid

REGULAR readers will recall my 10 liner in the October 1989 issue of *Elecron User* which displayed how much memory was left. It was this short utility that inspired me to write the Basic System Variables Lister, the program presented here.

The utility is useful to all programmers, as when the assembled code is run a full memory status display is printed on the screen.

When run, the utility reports the position of the start of the memory allocated to Basic programs, the number of bytes used and how many are free for use. The various Basic variables displayed by the program are listed in the table below.

To use the utility simply type in the program, correct any typing errors before saving, and then run it. (It is always wise to save a program which includes assembly language routines before running it, because sometimes fatal errors can creep in which cause your program to be lost).

After the code has been assembled, a message is displayed which requests you to save the object code under the filename of MHelp along with the addresses printed beside it. This is not done automatically so that you can save the file in your chosen library directory, so that it is available instantly at any moment.

The program works by performing three operations to print out each variable. First, the appropriate text string is printed by using a tabled address system, and secondly the X and Y registers are loaded with the contents of the relevant addresses. Finally, a hexadecimal print routine is called in which the variable values are printed out.

Where the values to be printed are calculated by subtracting one address from another, the calculations are performed before the hexadecimal printing routine is called.

Using the utility couldn't be simpler – just type *MHelp whenever you wish to check up on your memory. The addresses are printed out so that they can easily be read in any mode.

The assembled code is executed in pages &B and &C of the memory map. This means that you will be unable to use any user defined characters or function keys when the routine is in use, but if these facilities are necessary the code can always be relocated to &900 by altering the source code and re-assembling it.

The four zero page addresses used in the program as pointers are restored from the stack as the routine exits, so any important values stored in them are preserved.

Due to the way that the program directly accesses zero page addresses to gain its information, it is unlikely to work in languages other than Basic, because different languages store their memory pointers in different ways.

```
10 REM System Variables Lister
20 REM by S.P.Wade
30 REM (c) Electron User 1990
40 REM
50 MODE 6
60 buffer=&70
70 hexbuff=&72
80 FOR pass=0 TO 3 STEP 3
90 P%=&800
100 [OPT pass
110 \
120 LDA buffer
130 PHA
140 LDA buffer+1
150 PHA
160 LDA hexbuff
170 PHA
180 LDA hexbuff+1
190 PHA
200 LDA pointer
210 STA buffer
220 LDA pointer+1
230 STA buffer+1
240 JSR print
250 LDX &18
260 LDY #0
270 JSR hex
280 LDA pointer+2
290 STA buffer
300 LDA pointer+3
310 STA buffer+1
320 JSR print
330 LDX &13
340 LDY &12
350 JSR hex
360 LDA pointer+4
370 STA buffer
380 LDA pointer+5
390 STA buffer+1
400 JSR print
410 LDX &01
420 LDY &00
430 JSR hex
440 LDA pointer+6
450 STA buffer
460 LDA pointer+7
470 STA buffer+1
480 JSR print
490 LDX &03
500 LDY &02
510 JSR hex
520 LDA pointer+8
530 STA buffer
540 LDA pointer+9
550 STA buffer+1
560 JSR print
570 LDX &05
580 LDY &04
590 JSR hex
600 LDA pointer+10
610 STA buffer
620 LDA pointer+11
630 STA buffer+1
640 JSR print
650 LDX &07
660 LDY &06
670 JSR hex
680 LDA pointer+12
690 STA buffer
700 LDA pointer+13
710 STA buffer+1
720 JSR print
```

```
>*MHELP
BASIC Variables Lister
======================

(c) Electron User 1990
Written by S.P.Wade

PAGE   = &1900
TOP    = &23E3
LOMEM  = &23E3
Heap   = &24D6
Stack  = &5800
HIMEM  = &5800

Bytes Free = &332A
Bytes Used = &0BD6

>
```

Variable	Low byte address	High byte address
PAGE	Always zero	&18
TOP	&13	&12
LOMEM	&01	&00
Heap	&03	&02
Stack	&05	&04
HIMEM	&07	&06
Bytes Free	&07-&03	&06-&02
Bytes Used	&03-&18	&02

The Basic system variables and their storage address

If you wish to write a routine that performs a similar function in View, for example, the coding is essentially the same and all you need to know are the View variable addresses.

I find this routine most useful when I am programming as when used correctly it reduces the risk of running into the dreaded *No room* error. Any programs that use long variable names require a large amount of variable storage space, so do keep a watchful eye on how much memory is free.

I hope that you find the routine as useful as I have – it can avert disasters, especially when writing lengthy programs.

```
730 LDA &06
740 SEC
750 SBC &02
760 TAY
770 LDA &07
780 SBC &03
790 TAX
800 CLC
810 JSR hex
820 LDA pointer+14
830 STA buffer
840 LDA pointer+15
850 STA buffer+1
860 JSR print
870 LDA &02
880 SEC
890 SBC #0
900 TAY
910 LDA &03
920 SBC &18
930 TAX
940 CLC
950 JSR hex
960 JSR &FFE7
970 JSR &FFE7
980 PLA
990 STA hexbuff+1
1000 PLA
1010 STA hexbuff
1020 PLA
1030 STA buffer+1
1040 PLA
1050 STA buffer
1060 RTS
1070 \
1080 .pointer
1090 EQUW text1
1100 EQUW text2
1110 EQUW text3
1120 EQUW text4
1130 EQUW text5
1140 EQUW text6
1150 EQUW text7
1160 EQUW text8
1170 \
1180 .text1
1190 EQUW &0A0D
1200 EQUS "BASIC Variables Liste
r"
1210 EQUW &0A0D
1220 EQUS STRING$(22,"=")
1230 EQUD &0A0D0A0D
1240 EQUS "(c) Electron User 199
0"
1250 EQUW &0A0D
1260 EQUS "Written by S.P.Wade"
1270 EQUD &0A0D0A0D
1280 EQUW &0A0D
1290 EQUS "PAGE  = &"
1300 EQUB &FF
1310 \
1320 .text2
1330 EQUW &0A0D
1340 EQUS "TOP   = &"
1350 EQUB &FF
1360 \
1370 .text3
1380 EQUW &0A0D
1390 EQUS "LOMEM = &"
1400 EQUB &FF
1410 \
1420 .text4
1430 EQUW &0A0D
1440 EQUS "Heap  = &"
1450 EQUB &FF
1460 \
1470 .text5
1480 EQUW &0A0D
1490 EQUS "Stack = &"
1500 EQUB &FF
1510 \
1520 .text6
1530 EQUW &0A0D
1540 EQUS "HIMEM = &"
1550 EQUB &FF
1560 \
1570 .text7
1580 EQUD &0A0D0A0D
1590 EQUS "Bytes free = &"
1600 EQUB &FF
1610 \
1620 .text8
1630 EQUW &0A0D
1640 EQUS "Bytes Used = &"
1650 EQUB &FF
1660 \
1670 .print
1680 LDY #0
1690 \
1700 .print2
1710 LDA (buffer),Y
1720 CMP #&FF
1730 BEQ print3
1740 JSR &FFEE
1750 INY
1760 JMP print2
1770 \
1780 .print3
1790 RTS
1800 \
1810 .hex
1820 STX hexbuff
1830 STY hexbuff+1
1840 LDA hexbuff
1850 JSR hexprint
1860 LDA hexbuff+1
1870 JSR hexprint
1880 RTS
1890 \
1900 .hexprint
1910 PHA
1920 AND #240
1930 LSR A
1940 ROR A
1950 ROR A
1960 ROR A
1970 JSR hexprint2
1980 PLA
1990 AND #15
2000 \
2010 .hexprint2
2020 CLC
2030 ADC #48
2040 CMP #58
2050 BCC hexprint3
2060 CLC
2070 ADC #7
2080 \
2090 .hexprint3
2100 JMP &FFEE
2110 \
2120 ]
2130 NEXT
2140 PRINT
2150 PRINT
2160 PRINT "Program assembled."
2170 PRINT
2180 PRINT "Save to media using:
-"
2190 PRINT " *SAVE MHelp B00 ";S
~TR$~P%
2200 END
```


electron user MAIL ORDER OFFERS electron user MAIL ORDER OFFERS

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10 LINERS

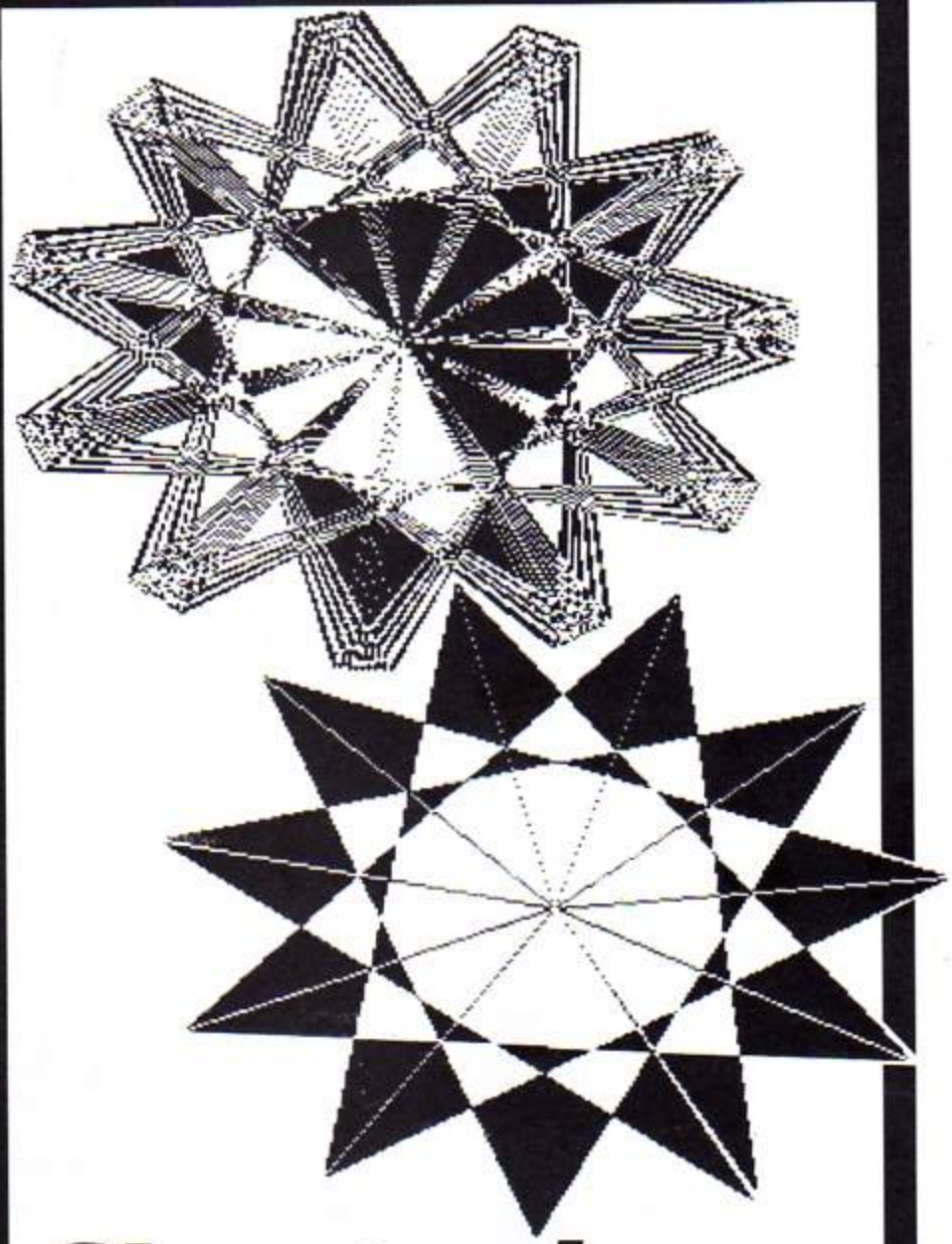
Water sports

OUR second 10 Liner this month comes from Mark Davidson of Peterhead. The program prints some text on the screen and, using a bit of machine code jiggery pokery, produces a wavy underwater effect that tends to make you seasick.

The rippling effect is created by rotating each character horizontally within its own character cell. A difficult task to achieve in Basic, it is a relatively simple procedure in machine code using the 6502's logical shift and rotate instructions.

Each byte in the screen memory is shifted one bit to the right and any set bit falling into the carry is placed in bit seven, the leftmost bit position. The code is short enough to be included in any arcade game and will add interest to a title screen or high score table.

```
   10 MODE4:DIM C% 100:ptr%=&70:
FOR I%=0 TO 2 STEP2:P%=C%:[OPTI%
   20 LDA #&58:STA ptr%+1:LDY #0
:STY ptr%:.loop LDA (ptr%),Y:LSR
 A:BCS pass:.go STA (ptr%),Y:INC
 ptr%:BNE loop:INC ptr%+1:LDA #&
80:CMP ptr%+1:BNE loop:RTS
   30 .pass EOR #&80:CLC:JMP go:
]:NEXT
   40 VDU 23,1,0;0;0;0;
   50 PRINT''SPC(10)"*A WATERY P
ROGRAM*"
   60 PRINT''SPC(10)" By Mark Da
vidson"
   70 PRINT'''SPC(10)"Using bit
shifting"
   80 PRINT'''SPC(10)"#########
########"
   90 FOR I%=0 TO 40:VDU31,RND(3
9),RND(8)+21,42:NEXT
   100 REPEAT:CALL C%:UNTIL 0
```



Short, sharp graphics

THIS program, another short graphics display demonstration proving just what your Electron is capable of, comes from Stephen Wade of Stockport, Cheshire.

The graphics display is split into two parts: Triangle plotting and line plotting. The triangle plotting takes the form of drawing a large polygon with ever flattening points, and the line drawing produces a type of three dimensional cone.

The triangle plotting is done using the PLOT 86 command and the line drawing by using PLOT 14. The program switches off keyboard input, so the only way out is by pressing Break or switching off.

As it stands the program runs reasonably fast in normal mode, but will be much more appreciated in Turbo mode.

```
   10 REM Triangles and lines
   20 REM by S.P.Wade
   30 MODE 4:OSCLI"FX 16":OSCLI"F
X 178":VDU 23,1,0;0;0;0;
   40 B%=640:C%=512:D%=500:MOVE 6
40,512
   50 REPEAT:FOR A%=1 TO 1000 STE
P 4:E=(SIN(A%)*D%)+B%:F=(COS(A%)*
D%)+C%
   60 PLOT 69,640,512:PLOT 86,E,F
:NEXT
   70 CLS:G%=4:B%=640:C%=512:D%=5
00
   80 REPEAT:FOR A%=1 TO 1000 STE
P G%:E=(SIN(A%)*D%)+B%:F=(COS(A%)
*D%)+C%
   90 PLOT 69,E*.35,F*.35:PLOT 14
,E,F
   100 NEXT:G%=G%+2:UNTIL G%=10:60
TO 30
```

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Number Recognition	Sail the required number of boats into harbour
Sorting	Put the right coloured shapes into sets
Addition	An easy introduction to sums and to those + and = symbols- coloured beads give a visual aid
Patterns	A fun hello to the important concept of sequences
Tallest	Spot the highest flower an exercise in visual perception

Sum Takeaway Age 6-7 yrs

Cheshire Cat **SUM-TAKEAWAY** includes

Addition	Full hello to sums
Subtraction	Starts with differences and introduces Take Away
Charts	Ways of recording information A vital concept in the child's future
Tens & Units	Delightful visual hello to numbers over nine
Multiply	First step in those times tables and the 'X' sign

Adder Sums Age 7-8yrs

Cheshire Cat **ADDER SUMS** includes

Multiplication	Calculate the cost of items shown in the grocer's shop window
Addition	Correctly total the shopping bill from the grocers
Division	Share out the biscuits using the simple technique provided
Time	Learn to tell the time of day, days of the week and the months of the year
Tables	Make a start or improve on those important times tables

Sum Times Age 8-9 yrs

Cheshire Cat **SUM TIMES** includes

Tally & Bar Charts	An easy introduction to graphs
Time	A moving clock for digital time
Tens & Units	Addition & Subtraction of numbers over nine
Symmetry	Lines of symmetry
Co-ordinates	Important for reading maps and graphs
Square Units	Invaluable for calculating areas etc

Sum Measure Age 9-13 yrs

Cheshire Cat **SUM MEASURE** includes

Length	Work out the length of a line in centimetres or millimetres
Area	Find the area of a rectangle using cm^2
Volume	Give the volume of a cuboid in cm^3
Temperature	Work out the temperature shown on the thermometer
Mass	Read the correct balance scale
Capacity	Measure the amount of liquid in the cylinder

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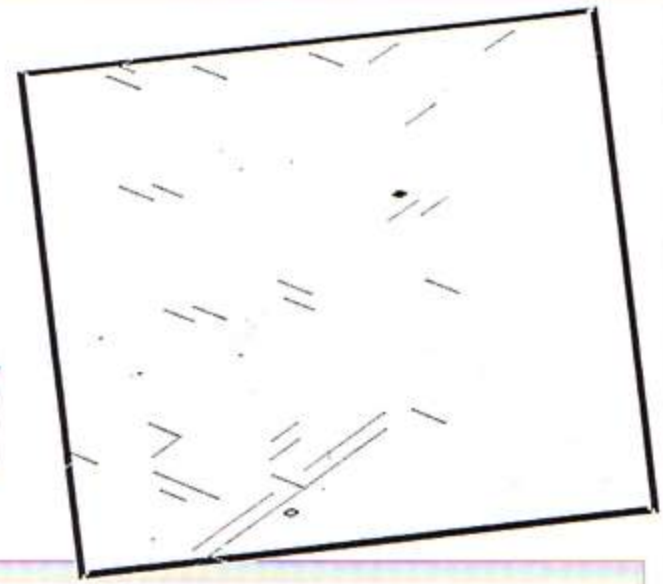
Caught on the rebound



DEFLECTOR is a fascinating game that is sure to have you hooked right from the start. A target looking like a small polo mint moves slowly around the screen and a rubber ball also bounces around. What you have to do is to make the ball hit the target by bouncing it off strategically placed deflector shields.

The idea is simple, but the gameplay is maddeningly frustrating – you'll soon be tearing your hair out as the ball bounces uncontrollably around the screen.

You have two controls – the keys < and > – which can be used to place an angled deflector just behind the ball. One deflector points one way and the other in the opposite direction. When the ball bumps into a deflector it bounces off in the appropriate direction. By careful placement of the deflectors you can make the ball bounce in any direction you wish, and so hit the slowly moving target. Well, that's the theory, but in practice it is quite difficult and requires a lot experimentation. Be prepared to spend the first few games just familiarising yourself with the controls.

At the start you have the option to change the difficulty level from zero (hardest) to nine (easiest). Start on level nine and master that before attempting to increase the difficulty.

Andrew Sage presents an unusual and addictive ball game

```
  10 REM Deflector
  20 REM By Andrew Sage
  30 REM (c) Electron User
  40 sp%=64:tottime%=0:go%=0
  50 MODE1:PROClevel
  60 REPEAT
  70 MODE5
  80 PROCinit
  90 PROCstart
 100 TIME=0
 110 hit%=FALSE:opx%=0:opy%=0
 120 REPEAT
 130 obx%=bx%:oby%=by%
 140 otx%=tx%:oty%=ty%
 150 bx%=bx%+bxd%:by%=by%+byd%
 160 tx%=tx%+bxd%*level*txd%:ty%
=ty%+byd%*level*txd%
 170 GCOL3,3:MOVEobx%,oby%:VDU5,
255
 180 IFINKEY-103 PROCapright ELS
E IF INKEY-104 PROCapleft
 190 GCOL3,3
 200 col%=POINT(bx%+32,by%-16):M
OVEbx%,by%:VDU255
 210 px%=INT(tx%/64)*64:py%=INT(
ty%/32)*32:IFpx%=opx% AND py%=opy
%:GOTO240
 220 MOVEopx%,opy%:VDU254:opx%=p
x%:opy%=py%
 230 MOVEpx%,py%:VDU254,4
 240 col1%=POINT(px%+32,py%-16)
 250 IFbx%<64 OR bx%>1215 OR by%
<64 OR by%>1020 col%=3
 260 IFtx%<64 OR tx%>1215 OR ty%
<64 OR ty%>1020 col1%=3
 270 IFtx%<64 tx%=64 ELSE IF tx%
>1215 tx%=1215 ELSE IF ty%<64 ty%
=64 ELSE IF ty%>1020 ty%=1020
 280 IFcol%<>0 PROChit
 290 IFcol1%<>0 txd%=-txd%
 300 IF(bx%/64=INT(tx%/64))AND(b
y%/32=INT(ty%/32)) hit%=TRUE
 310 UNTILhit%=TRUE
 320 t%=TIME:tottime%=tottime%+t
%:go%=go%+1
 330 MODE1
 340 COLOUR1
 350 PRINTTAB(2,7);"Time this go
 was ";(t%/100);" seconds."
 360 COLOUR2
 370 PRINTTAB(1,9);"Average time
 is ";INT(tottime%/go%/100);" sec
onds."
 380 COLOUR3
 390 PRINTTAB(0,14);"Press 'SPAC
E' to restart or 'C' to "
 400 PRINTTAB(5,15);"change diff
iculty."
 410 REPEAT:A$=GET$:UNTILA$=" "O
RA$="C"
 420 IFA$=" " UNTILFALSE
 430 CLS
 440 PROClevel:UNTILFALSE
 450 DEFPROChit
 460 IFcol%=3 ORcol%=-1 bxd%=-bx
d%:byd%=-byd%:ENDPROC
 470 IFcol%=2 GOTO520
 480 IFbxd%>0 bxd%=0:byd%=sp%/2:
ENDPROC
 490 IFbxd%<0 bxd%=0:byd%=-sp%/2
:ENDPROC
 500 IFbyd%>0 byd%=0:bxd%=sp%:EN
DPROC
 510 byd%=0:bxd%=-sp%:ENDPROC
 520 IFbxd%>0 bxd%=0:byd%=-sp%/2
:ENDPROC
 530 IFbxd%<0 bxd%=0:byd%=sp%/2:
ENDPROC
 540 IFbyd%>0 byd%=0:bxd%=-sp%:E
NDPROC
 550 byd%=0:bxd%=sp%:ENDPROC
 560 DEFPROCapright
 570 GCOL0,0:PROClile
 580 GCOL0,1:PROCliri
 590 ENDPROC
 600 DEFPROCapleft
 610 GCOL0,0:PROCliri
 620 GCOL0,2:PROClile
 630 ENDPROC
 640 DEFPROCliri:MOVEbx%,by%-32:
DRAWbx%+64,by%:ENDPROC
 650 DEFPROClile:MOVEbx%,by%:DRA
Wbx%+64,by%-32:ENDPROC
 660 DEFPROClevel
 670 COLOUR1
 680 PRINTTAB(5,5);"Input diffic
ulty level."
 690 COLOUR2
 700 PRINT''TAB(2);"(0) Hard ñ-
(9) Easy."
 710 COLOUR3
 720 REPEAT:A=GET-48:UNTILA>=0 A
ND A<=9
 730 level=1/(A+1)
 740 VDU23,255,0,0,24,60,60,24,0
,0
 750 VDU23,254,0,0,24,36,36,24,0
,0
 760 ENDPROC
 770 DEFPROCinit
 780 bx%=640:by%=512
 790 bxd%=sp%:byd%=0
 800 txd%=1
 810 tx%=(RND(12)+2)*64:ty%=(RND
(24)+2)*32
 820 VDU19,3,4;0;
 830 ENDPROC
 840 DEFPROCstart
 850 GCOL0,3
 860 FORI=0 TO 12 STEP 4
 870 MOVEI+16,I:DRAW1263-I,I
 880 MOVE1279-I,I:DRAW1279-I,102
0-I
 890 MOVE1263-I,1024-I:DRAWI+16,
1024-I
 900 MOVEI,1024-I:DRAWI,I
 910 DRAWI,I
 920 NEXT
 930 GCOL3,3:MOVEbx%,by%:VDU5,25
5
 940 ENDPROC
```

Put them in the picture

Paul Hodgskin offers a graphical utility for analysing statistical data

IT is said that a picture is worth 1,000 words, and nowhere is this more true than when analysing complex data. Show anyone long lists of facts and figures and their eyes soon begin to glaze over as they struggle to spot trends and draw conclusions.

Turn those lists of figures into a graphical form – a pie chart, line graph or bar chart – and the statistical data becomes much more meaningful. Patterns and trends become obvious and it is easy to extrapolate results.

Plotter is a powerful graphing program that will enable you to create graphs with ease. All you need to do is to choose the type you want, then type in the data – everything else is automatically handled by the Electron.

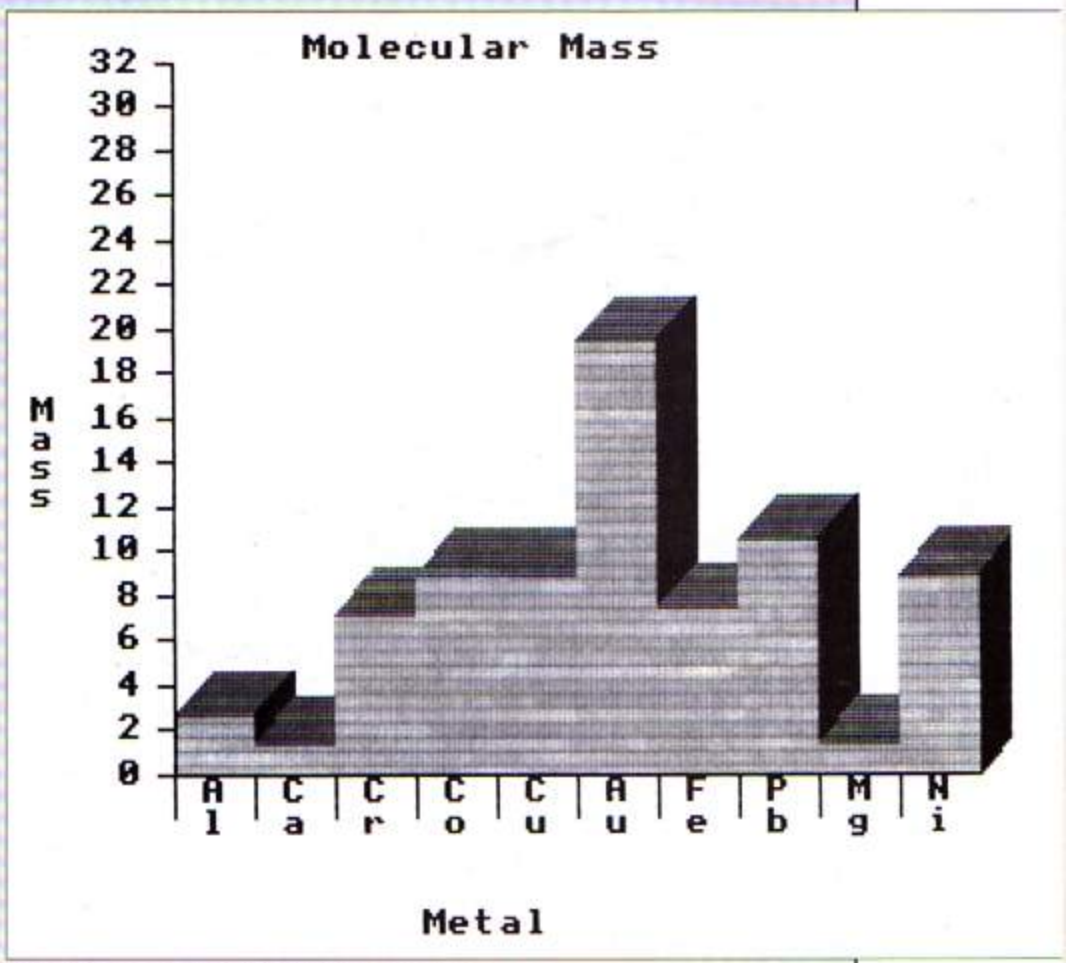
The axes are drawn and lebelled – you are prompted for the labels – the scale is put on and the title printed at the top of the screen (another prompt for this information). Then you have the option to dump the graph to the printer.

Unfortunately, the program doesn't contain its own printer dump routine so you'll have to supply your own. Several have been published in *Electron User* over the past few years, the most recent being in the August 1989 issue. You can load this into memory and call it from line 990.

The program is menu driven and you can display the data as a pie chart, 3D pie chart, bar chart, 3D bar chart or line graph. Just press the number key next to the required option – it couldn't be simpler.

```
  10REM Graph Plotter
  20REM By Paul Hodgskin
  30REM (c) Electron User
 120ONERRORIFERR=17GOTO140 ELSE
MODE6:REPORT:PRINT" at line ";ERL
:END
 130MODE1:VDU23;8202;0;0;0;:PROC
init
 140REPEATPROCmain:UNTIL0
 150DEFPROCinit:DIM bar$(20),bar
(20),sector$(40),sector(40),point
X(40),pointY(40):bardata=FALSE:pi
edata=FALSE:linedata=FALSE:ENDPRO
C
 160DEFPROCborder
 170CLS:GCOL0,1:FORT=0 TO 28 STE
P 8:MOVET,T:DRAW1279-T,T:DRAW1279
-T,1023-T:DRAWT,1023-T:DRAWT,T:NE
XT:FORT=874 TO 900 STEP 8:MOVE28,
T:DRAW1252,T:NEXT:VDU28,1,30,38,1
:ENDPROC
 180DEFPROCmain:VDU20:PROCborder
:COLOUR3:PRINTTAB(14,1);"MAIN MEN
U":COLOUR2:RESTORE:FORT=1 TO 8:RE
AD menu$:PRINTTAB(3,T*2+6);T;")..
.";menu$:NEXT
 190REPEATA=GET-48:UNTILA>0 AND
A<10
 200VDU19,2,6;0;19,1,4;0;
 210IFA=1 PROCbar_data ELSE IFA=
2 AND bardata=TRUE PROCnorm_bar E
LSE IFA=3 AND bardata=TRUE PROCt_
bar
 220IFA=4 PROCpie_data ELSE IFA=
5 AND piedata=TRUE PROCnorm_pie E
LSE IFA=6 AND piedata=TRUE PROCt_
pie
 230IFA=7 PROCline_data ELSE IFA
=8 AND linedata=TRUE PROCline ELS
E VDU7:GOTO140
 240ENDPROC
 250DATA Define Data for Bar Cha
rt,Draw Normal Bar Chart,Draw 3-D
 Bar Chart,Define Data for Pie Ch
art,Draw Normal Pie Chart,Draw 3-
D Pie Chart,Define Data for Line
Graph,Draw Line Graph
 260DEFPROCbar_data:CLS:PROCbord
er:COLOUR3:PRINTTAB(5,1);"DEFININ
G DATA FOR BAR CHART"
 270COLOUR2:PRINTTAB(2,8);"What
is the scale :":INPUTTAB(2,10)sca
le:PRINTTAB(2,8);STRING$(60," "):
PRINTTAB(2,10);"Scale - ";scale:m
ax=16*scale:PRINTTAB(2,12);"Max h
eight on vertical axis - ";max
 280PRINTTAB(2,15);"Okay (Y/N)":
REPEATA$=GET$:UNTILA$="Y"ORA$="N"
:PRINTTAB(2,15);STRING$(10," "):I
FA$="N"VDU28,1,30,38,5:CLS:VDU28,
1,30,39,1:GOTO270
 290VDU28,1,30,38,5:CLS:VDU28,1,
30,38,1:PRINTTAB(2,8);"How many b
ars :":INPUTTAB(2,10)bars:Ifbars>
20 GOTO290
 300PRINTTAB(2,15);"Okay (Y/N)":
REPEATA$=GET$:UNTILA$="Y"ORA$="N"
:PRINTTAB(2,15);STRING$(10," "):I
FA$="N"GOTO290
 310FORT=1 TO bars:CLS:PRINT'"Ba
r ";T
 320INPUT'"Name (Max length : 4
letters) : "bar$(T):IFLENbar$(T)>
4 VDU7,11,11:PRINTSTRING$(80," ")
:VDU7,11,11,11:GOTO320
 330INPUT'"Height : "bar(T):IFba
r(T)>max OR bar(T)<0 VDU7,11,11:P
RINTSTRING$(80," "):VDU11,11,11:G
OTO330
 340NEXT:PROCconvert:bardata=TRU
E
 350CLS:PRINTTAB(0,2);"What is t
he title of the Bar chart :":INPU
T'""btitle$:IFLENbtitle$>37 PRINT
'"Too Long":REPEATUNTILGET:GOTO035
0
 360CLS:PRINTTAB(0,2);"What is t
he X axis called :":INPUT'""xaxis
$:IFLENxaxis$>37 PRINT'"Too Long"
:REPEATUNTILGET:GOTO360
 370CLS:PRINTTAB(0,2);"What is t
he Y axis called :":INPUT'""yaxis
$:IFLENyaxis$>26 PRINT'"Too Long"
:REPEATUNTILGET:GOTO370
 380ENDPROC
 390DEFPROCnorm_bar:VDU26:CLS:st
ep=1000/bars
 400FORT=0 TO bars-1:GCOL0,T MOD
 3+1:MOVET*step+240,150:MOVET*ste
p+240,bar(T+1)+150:PLOT85,T*step+
240+step,bar(T+1)+150:MOVET*step+
240+step,150:PLOT85,T*step+240,15
0:NEXT:GCOL0,3
 410PROCaxis:PROCprint:ENDPROC
 420DEFPROCt_bar:VDU26:CLS
 430step=1000/bars:FORT=0 TO bar
s-1:GCOL0,1:MOVET*step+240,150:MO
VET*step+240,bar(T+1)+150:PLOT85,
T*step+240+step,bar(T+1)+150:MOVE
T*step+240+step,150:PLOT85,T*step
+240,150
 440GCOL0,2:MOVET*step+240,bar(T
+1)+150:MOVET*step+240+step,bar(T
+1)+150:PLOT85,T*step+290+step,ba
r(T+1)+200:MOVET*step+290,bar(T+1
)+200:PLOT85,T*step+240,bar(T+1)+
150
 450GCOL0,3:MOVET*step+240+step,
bar(T+1)+150:MOVET*step+290+step,
bar(T+1)+200:PLOT85,T*step+290+st
ep,200:MOVET*step+240+step,150:PL
OT85,T*step+240+step,bar(T+1)+150
:NEXT
 460PROCaxis:PROCprint:ENDPROC
 470DEFPROCaxis:GCOL0,3:MOVE240,
950:DRAW240,150:DRAW1240,150:FORT
=150 TO 950 STEP 50:MOVE240,T:DRA
W220,T:VDU5:MOVE-120,T+16:PRINT((
T-150)/50)*scale:NEXT
 480bar=1:FORT=240 TO 1230 STEP
step:MOVET,150:DRAWT,100:FORL=1 T
O 4:MOVET+(1000/bars)/2-16,180-(L
*36):VDU5:PRINTMID$(bar$(bar),L,1
):VDU4:NEXTL:bar=bar+1:NEXTT:PROC
title(((39-LENbtitle$)/2)*32,980,
btitle$)
 490COLOUR3:PRINTTAB(0,31):PRINT
TAB((39-LENxaxis$)/2,31)xaxis$;:s
tart=(29-LENyaxis$)/2:FORT=1 TO L
ENyaxis$:PRINTTAB(0,T+start);MID$
(yaxis$,T,1):NEXT:ENDPROC
 500DEFPROCtitle(X,Y,A$):VDU5:GC
OL0,0:MOVEX+4,Y+4:PRINTA$:MOVEX-4
,Y+4:PRINTA$:MOVEX-4,Y-4:PRINTA$:
MOVEX+4,Y-4:PRINTA$:GCOL0,3:MOVEX
,Y:PRINTA$:VDU4:ENDPROC
 510DEFPROCprint:MOVE480,830:GCO
L4,0:VDU5:PRINT"Print (Y/N)":OSCL
I"FX15":REPEATA$=GET$:UNTILA$="Y"
 OR A$="N":MOVE480,830:PRINT"Prin
t (Y/N)":VDU4:IFA$="Y" PROCdump:E
NDPROC ELSE ENDPROC
 520DEFPROCconvert:FORT=1 TO bar
s:bar(T)=(bar(T)/scale*50):NEXT:E
```

```
NDPROC
  530DEFPROCpie_data:CLS:PROCbord
er:COLOUR3:PRINTTAB(5,1);"DEFININ
G DATA FOR PIE CHART"
  540COLOUR2:PRINTTAB(2,8);"How m
any sectors :":INPUTTAB(2,10)""se
ctors:IFsectors<1 OR sectors>40 V
DU7:PRINT'" Silly":REPEATUNTILGE
T:VDU28,1,30,38,5:CLS:VDU28,1,30,
38,1:GOTO540
  550FORT=1 TO sectors
  560CLS:PRINT'"Sector ";T:INPUT'
"Name (Max length : 6 letters) :
"sector$(T):IFLENsector$(T)>6 VDU
7:GOTO560
  570INPUT'"Size : "sector(T):NEX
T:total=0:FORT=1 TO sectors:total
=total+sector(T):NEXT:one=360/tot
al:FORT=1 TO sectors:sector(T)=se
ctor(T)*one:NEXT
  580CLS:PRINTTAB(0,2);"What is t
he title of the Pie chart :":INPU
T'""ptitle$:IFLENptitle$>37 PRINT
'"Too Long":REPEATUNTILGET:GOTO58
0
  590piedata=TRUE:ENDPROC
  600DEFPROCnorm_pie:sec=1:col=1:
tot=0:VDU26:CLS:PROCpie(450,450):
VDU29,0;0;:PROCprint:ENDPROC
  610DEFPROCt_pie:sec=1:col=1:tot
=0:VDU26:CLS:FORT=0 TO 266 STEP 4
:IFT>(tot+sector(sec))sec=sec+1:c
ol=col+1:tot=tot+sector(sec-1):IF
col>3 col=1:IFsec=sectors AND col
=1 col=2
  620VDU29,640;512;:GCOL0,col:MOV
ESINRADT*450,COSRADT*150:MOVESINR
ADT*450,COSRADT*150-150:PLOT85,SI
NRAD(T+4)*450,COSRAD(T+4)*150-150
:MOVESINRAD(T+4)*450,COSRAD(T+4)*
150:PLOT85,SINRADT*450,COSRADT*15
0:NEXT:PROCpie(450,150)
  630PROCprint:ENDPROC
  640DEFPROCpie(A,B):sec=1:col=1:
tot=0
  650FORT=0 TO 356 STEP 4:IFT>(to
t+sector(sec))sec=sec+1:col=col+1
:tot=tot+sector(sec-1):IFcol>3 co
l=1:IFsec=sectors AND col=1 col=2
  660VDU29,640;512;:GCOL0,col:MOV
E0,0:MOVE SINRADT*A,COSRADT*B:PLO
T85,SINRAD(T+4)*A,COSRAD(T+4)*B:N
EXT
  670tot=0:FORT=1 TO sectors:IFse
ctor(T)+tot>180 sector$(T)=STRING
$(LENsector$(T),CHR$8)+sector$(T)
  680PROCtitle(SINRAD(tot+(sector
(T)/2))*A,COSRAD(tot+(sector(T)/2
))*B+32,sector$(T)):tot=tot+secto
r(T):NEXT:VDU4
  690VDU29,0;0;30,11,11
  700PROCtitle(((39-LENptitle$)/2
)*32,980,ptitle$)
  710ENDPROC
  720DEFPROCline_data:CLS:PROCbor
der:COLOUR3:PRINTTAB(5,1);"DEFINI
NG DATA FOR LINE GRAPH"
  730COLOUR2:PRINTTAB(2,8);"What
is the scale of the X axis :":INP
UTTAB(2,10)xscale:PRINTTAB(2,8);S
TRING$(60," "):PRINTTAB(2,10);"X
axis scale - ";xscale:xmax=xscale
*19:PRINTTAB(2,12);"Max height on
 X axis - ";xmax
  740PRINTTAB(2,16);"What is the
scale of the Y axis :":INPUTTAB(2
,18)yscale:PRINTTAB(2,16);STRING$
(60," "):PRINTTAB(2,18);"Y axis s
cale - ";yscale:ymax=yscale*15:PR
INTTAB(2,20);"Max height on Y axi
s - ";ymax
  750PRINTTAB(2,23);"Okay (Y/N)":
REPEATA$=GET$:UNTILA$="Y"ORA$="N"
:PRINTTAB(2,13);STRING$(10," "):V
DU28,1,30,38,5:CLS:VDU28,1,30,38,
1:IFA$="N"GOTO730
  760PRINTTAB(2,8);"How many poin
ts :"
  770INPUTTAB(2,10);""points
  780IFpoints<1 OR points>40 PRIN
T'"Silly":VDU7:REPEATUNTILGET:VD
U28,1,30,38,5:CLS:VDU28,1,30,39,1
:GOTO760
  790VDU28,1,30,38,5:FORT=1 TO po
ints:CLS:PRINT'"Point ";T'
  800INPUT"X axis : "pointX(T):IF
pointX(T)<0 OR pointX(T)>xmax PRI
NTCHR$11;STRING$(60," "):VDU7,11,
11:GOTO800
  810INPUT"Y axis : "pointY(T):IF
pointY(T)<0 OR pointY(T)>ymax PRI
NTCHR$11;STRING$(60," "):VDU7,11,
11:GOTO810
  820NEXT
  830VDU28,1,30,38,5:CLS:PRINTTAB
(0,2);"What is the title of the l
ine graph :":INPUTTAB(0,4)ltitle$
  840CLS:IFLENltitle$>37 PRINT'"T
oo long":VDU7:REPEATUNTILGET:GOTO
830
  850CLS:PRINTTAB(0,2);"What is t
he X axis called :":INPUT'""lxaxi
s$:IFLENlxaxis$>37 PRINT'"Too Lon
g":REPEATUNTILGET:GOTO850
  860CLS:PRINTTAB(0,2);"What is t
he Y axis called :":INPUT'""lyaxi
s$:IFLENlyaxis$>26 PRINT'"Too Lon
g":REPEATUNTILGET:GOTO860
  870FORT=1 TO points:pointX(T)=(
pointX(T)/xscale*50):pointY(T)=(p
ointY(T)/yscale*50):NEXT
  880VDU26:CLS:linedata=TRUE:ENDP
ROC
  890DEFPROCline
  900VDU26:CLS:GCOL0,3:MOVE240,10
00:DRAW240,200:DRAW1240,200:FORT=
200 TO 950 STEP 50:MOVE240,T:DRAW
220,T:NEXT
  910FORT=240 TO 1190 STEP 50:MOV
ET,200:DRAWT,180:NEXT
  920GCOL0,2:MOVEpointX(1)+240,po
intY(1)+200:FORT=2 TO points:DRAW
pointX(T)+240,pointY(T)+200:NEXT
  930GCOL0,3:VDU5:FORT=1 TO 16:MO
VE-120,(T*50)+164:PRINT(T-1)*ysca
le:NEXT
  940FORT=240 TO 1190 STEP 50:num
$=STR$(xscale*((T-240)/50))
  950FORL=1 TO LENnum$:MOVET-16,1
92-(L*32):PRINTMID$(num$,L,1):NEX
TL:NEXTT:VDU4:COLOUR3
  960PRINTTAB(0,31):PRINTTAB((39-
LENlxaxis$)/2,31)lxaxis$;:start=(
29-LENlyaxis$)/2:FORT=1 TO LENlya
xis$:PRINTTAB(0,T+start);MID$(lya
xis$,T,1):NEXT
  970PROCtitle(((39-LENltitle$)/2
)*32,1020,ltitle$):PROCprint:VDU2
6:CLS:ENDPROC
  980DEFPROCdump
  990REM Load and call a
  992REM screen dump routine
  994REM from here
 1000ENDPROC
```



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MICRO MESSAGES

When your Electron throws a wobbly...

II HAVE got an Electron with a dodgy power lead. When I type in long Basic programs and the lead to the micro wobbles – zap! All my typing is lost.

It is a great shame that I cannot use the Forget Me Not article in the April 1989 issue of Electron User. *I have tried taping the power lead to the desk and on to the computer, but it doesn't help.*

Is it possible to make the Electron less dodgy without buying a Plus 1, Plus 3 or any other Plus?

At school I like to write educational games, bar charts, alphabetical sorters and many other programs. I find the BBC Micro's and Electron's style of Basic very good.

Finally, I notice that your magazine is called electron user, *but shouldn't it be called* Electron User? – **P.W.T. Mash (age 9), Beverly, East Yorkshire.**

● This is a common problem with old and well used Electrons. It is most likely caused by a break in the power lead at either the plug end or the Electron end, usually the latter.

Pres should be able to supply you with a plug and switch which replaces the Electron end of the cable, curing the intermittent fault if that's where it lies.

If it is at the other end then you'll have to get someone to take the power supply apart, cut off the damaged section of wire and resolder the good wires back on. It is a simple enough task, but you need to take care when mains power supplies are involved.

The *electron user* title is taken from the name on the micro – take a look, it has a lowercase e.

Close encounter of the Thargoid kind

I HAVE been playing Elite for three years and have now reached Elite status. I have been to all eight galaxies, but as of yet I have never met a Thargoid.

Is it possible to encounter Thargoids in the Electron version?I am also considering upgrading my Electron by buying Software Bargains' new interface board. The basic version of this has only one cartridge port. Can this be used to add a disc drive? – **M.W. Bone, Guildford, Surrey.**

● Unfortunately, you won't meet any Thargoids in the Electron version of Elite. They were vicious aliens that inhabited hyperspace, ambushing you in between star systems, but they are all now extinct.

The Software Bargains board works with Slogger's disc interface, but we have had reports of some not working with Pres' AP4 interface. The board is simply the cheapest way of expanding the Electron and in the long run it may be wiser to save up for a more robust unit such as Pres' Plus 6 (an improved version of Acorn's Pus 1).

Electron User for BBC Micro users

I AM a subscriber to your excellent magazine, but I own a BBC Micro! A few months ago a I received a BBC Micro (issue four) with an Opus Challenger disc drive. So far the free monthly tapes work fine. I did try other magazines, but there are none quite like Electron User.

What is the longest program you have published? The longest I have seen is 3A blocks long on tape. Could you tell me what a Winchester is and what it does as I have heard them mentioned many times? – **Alex Buckland, Reading, Berkshire.**

● The length of programs that we publish is restricted to a maximum of about 12k – this is a very long program indeed and would take up about three pages of solid listing. How do readers feel about long type-ins? Are they worth it? Does anyone bother? Let us know what you think.

You won't hear much about Winchesters in *Electron User* as the Electron can't use them. It is a special disc drive that has a disc permanently sealed inside it – you can't change it like a floppy disc.

The hard disc mechanics are made to a very high precision and are quite delicate and easily damaged. However, the storage capacity is phenomenal and a medium size disc will hold 40,000,000 bytes – 400 times as much as an ordinary 40 track DFS floppy disc.

Keeping tabs on soccer results

MY dad bought our Electron the year it was launched and we have gradually expanded it. We now have an AP1, AP3, View, Viewsheet and a Citizen 120D printer. We have subscribed since the very first issue of Electron User and are very pleased that you now include a tape with the magazine.

I play football in a youth league every weekend, but unfortunately our local paper publishes the league table very infrequently. Could you tell me of a program where I can enter my division and which will alter the positions of the teams and update the points and so on when I enter the results?

If there is not already a program to do this could you please consider publishing one in a future issue of Electron User? – **Paul Mickleburgh, Lowestoft, Suffolk.**

● We don't know of any program written specifically to do this, but if any reader can write one then we will consider publishing it.

Printing View on a Schneider

WE have been regular subscribers to your magazine for the past year and have recently taken advantage of the special offer advertised to buy View and Viewsheet, and also a Schneider printer. My husband contacted you recently regarding operation of the printer driver and I now have some other queries.

Will the screen dump program from the August 1989 issue of Electron User *work on our Schneider? And are there instructions*

➤

Zysyshelp has its uses

COULD you please tell me what ZXSYSHELP is for when a disc is formatted on a Plus 3. I think I read somewhere that it should not be deleted, but I have done so to gain more disc space with no apparent ill effects. – **J.D. Renaud, Wolverhampton.**

● There is a slight bug in the Plus 3's ADFS that occasionally makes reading and writing to the early part of the floppy disc unreliable. To combat this a long file called ZYSYSHELP is written to the disc after formatting and by occupying this first part of the disc any programs or data files are forced past this section.

You can delete it, though you need to unlock it first, to release more disc space, but don't be surprised if one day you get a disc error when reading or writing to this part of the disc.

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which tell us how to use the dump, as although we have copies of screen dumps from October 1988 and January 1989, neither explain fully how to use them.

Can you tell me if the Advanced User Guide would give us more information on the use of our Electron now that we can operate View, Viewsheet and a printer. – ***Aleen Medcalf, Buerton, Crewe.***

● We haven't used a Schneider printer, but if it is Epson compatible then it should work. Machine code screen dumps are run with a CALL command, and in the case of the dump in the August 1989 issue you must CALL &C00. Basic dumps are usually executed with a simple procedure call.

The Advanced User Guide is an invaluable guide and source of technical data for programmers. It is heavy going in parts, but well written. It isn't much use unless you intend getting your hands dirty with machine code programming.

Home finance improvements

LIKE Steven Coultas (Micro Messages November 1989) I was unable to get a printout of Home Finance Manager after making the changes suggested by A.R. Dunks in the September 1989 issue.

After studying the listing for some time, I noticed that in line 680 the number 24 had no brackets around it, but all the other numbers had. I inserted the missing brackets and hey presto, it worked. Line 680 should read:

```
680 PRINT date$(i)TAB(6)detail$
(i)TAB(24)dc(i)TAB(32)balance(i)
```

– **E.S. Brotherhood, Swinton, Manchester.**

● Just to recap for anyone who is confused – the original program is OK, but we printed an error in A.R. Dunks' improvements in the September 1989 issue of Micro Messages. The correct line is that printed above.

Put a pen to disc petition

I AM starting a campaign to persuade software houses to release more software for the Electron on 3.5in disc. I am starting with Superior Software and welcome any support.

Please write to Superior Software asking it to change the format it uses when releasing hits. Electron versions are nearly always on tape which are slow and boring to load.

If anyone can get a petition going and send it to me it would be great. – **Alex Buckland, 22, Fawcett Crescent, Woodley, Reading, Berkshire.**

Basic way to use a driver

THANK you for the printer driver program in the December 1989 issue of Electron User, *I am sure that it will be useful when I load it.*

The problem is that I get the response Not with cassette, *indicating that I need a disc drive. I have also tried the command PR to load the new printer driver, but the screen just goes blank. I don't have a disc drive, so can you help with this problem?*

My Amstrad printer uses various escape codes for its functions. Is there any way I can access the printer direct without using a program?

Thanks for a great magazine, my new tape subscription is a boon. – **M.A. Budd, Staines, Middlesex.**

● It sounds like you are not using the printer driver correctly. It is a Basic program that needs to be run in Basic – you don't load it into View. Run the program to create your driver, giving the resultant machine code file a meaningful name like DRIVER.

Now go into View and load the printer driver with the command PRINTER DRIVER (or PRINTER FRED if you called the machine code driver file FRED).

You cannot type LOAD to load it, and with a cassette-based system this will give you the error message *Not with cassette*. You don't need a disc drive. You can directly access the printer by pressing Control+B, this makes the printer echo anything you type into the micro. Control+C switches off the printer.

Top conversions wanted

IN the December issue of Electron User *Simon Tarry asked for more conversions of top games like Robocop and Dragon Ninja and I would like to add my support to his plea. I would also like to see Out Run and Ghostbusters II. Are there any plans to convert these games?*

Budget priced games seem to be the only ones you can buy in the shops. Some are very good, like Yie-Yar Kung Foo and Joe Blade, but some are poor and shouldn't even be on sale.

Does the Slogger Master Ram Board give you BBC Micro compatibility? And finally, can anyone help me with level two of The Last Ninja? – **Adam Chapman, Scotland.**

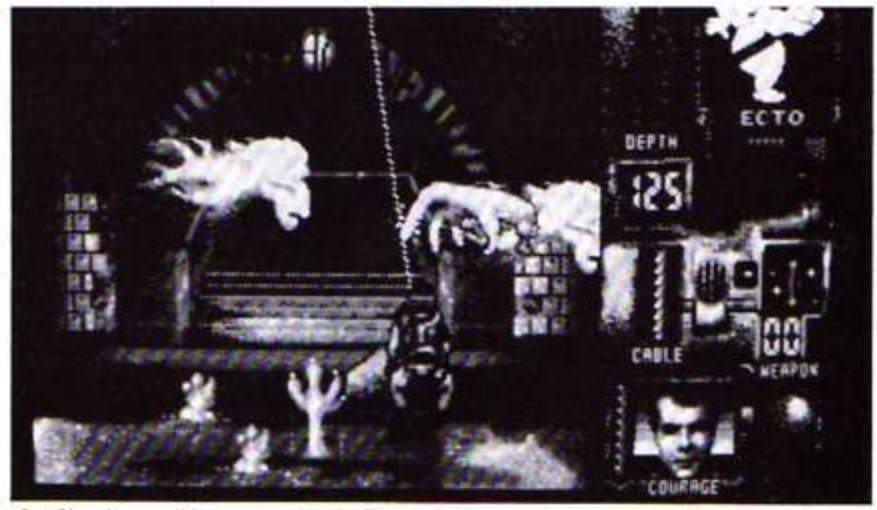
* * *

I AM writing in support of Simon Tarry's letter asking for new and better games for the Electron. I also think that arcade games like R-Type, Robocop and Dragon Ninja should be converted. Surely it would not be too difficult to alter the program or make a smaller, less detailed version?

Like Simon, I am also asking for others to write in support of conversions to US Gold (Units 2/3, Holford Way, Holford, Birmingham) and Ocean (6 Central Street, Manchester). The former may convert Strider or Forgotten Worlds, while the latter may convert Robocop, New Zealand Story and Dragon Ninja. – **James Glodkowski, Radcliffe-on-Trent, Nottinghamshire.**

● Superior Software might be producing an Electron version of Robocop, but there is no news about the other games listed.

The Master Ram Board does not increase or decrease the BBC compatibility, it simply makes the Electron faster and provides more memory in the form of shadow ram.



Can Ghostbusters II be converted to the Electron?

Cheats are sadly lacking

I AM a seven-year-old boy who loves playing computer games. My favourites are Imogen, Palace of Magic, Project Thesius, Ravenskull, Crazee Rider, Frak, Commando, Spellbinder and Codename: Droid.

I am issuing a plea to readers to send in cheats and tips for all these games (they are all compilation versions – Sam 2, 3, 4 and 5 and Five Star Games 3), or any other games as I have got all the Sam volumes.

I cannot get past Herbet Droid on Codename: Droid, the parrot on Imogen and the guard with the flamethrower in Project Thesius.

I find it fun trying all your programs and thoroughly enjoy your magazine. – **John Buchanan, Gillingham, Kent.**

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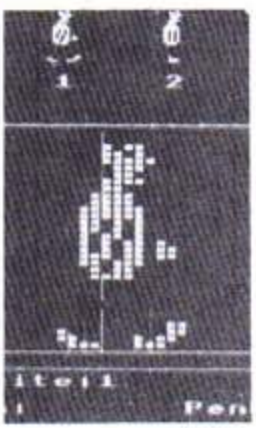

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IMPACT Software

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(The Fourth Dimension)

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(The Fourth Dimension)

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(The Fourth Dimension)

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from only £9.95

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Due to overwhelming public demand The 4th Dimension has now produced 2 volumes of extra courses for their superb 3D golf game Holed Out. Each volume contains 2 superbly designed brand new courses plus the original Holed Out program, therefore you do not need the original Holed Out in order to play them.

"I play golf and this game is the closest thing I've seen to the real game on a computer". *Archive, June 1989*
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"The 3D perspective graphics are stunning". *Electron User GOLDEN GAME June 89*
"Holed Out is great.....The game plays very well and the graphics are superb." *Popular Computing Weekly, March 1989*
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from The Fourth Dimension

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U.I.M. is disc only and will run on BBC B or B+ with sideways RAM and Master Series Computers. The full colour Archimedes version is due for release 6th December.

Prices above and opposite

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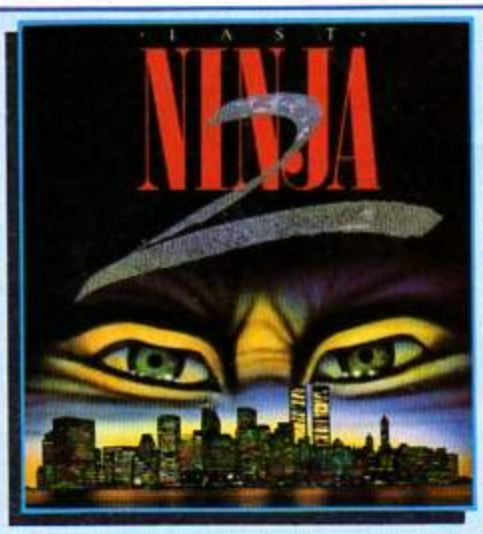

A Thug in the Cellar

Mugged on the Street

LAST NINJA 2 - Back with a Vengeance!

Born in a time of peace, lived in a time of war; the shadow warrior returns. Leaping the abyss of time he comes to fulfil his destiny!

DATELINE: 1990 THE PLACE: Downtown New York
THE QUEST: To destroy the eternal evil.....Kunitoki!

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PLAY IT AGAIN SAM 12
A New Action-Packed Four-Game Compilation

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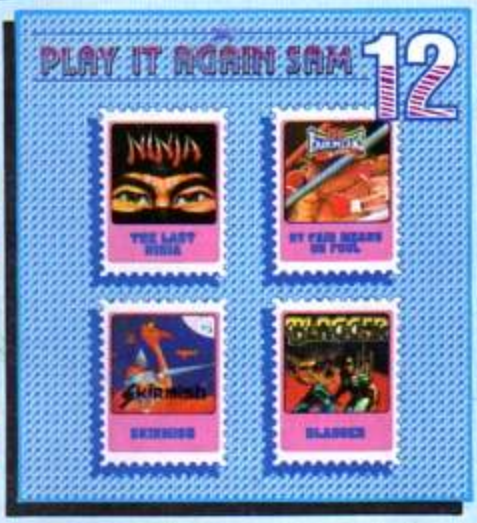
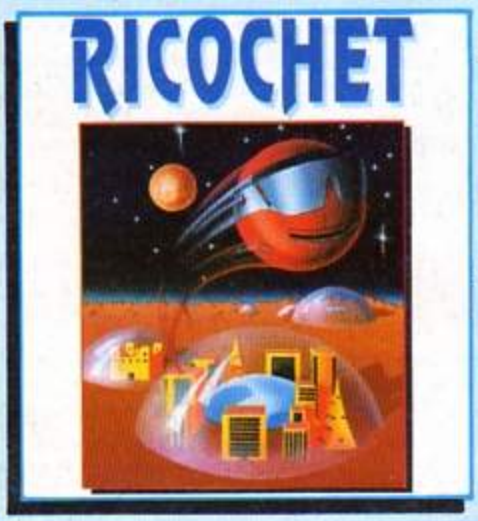
The Last Ninja

Skirmish





Level 2 - Techlev

Level 3 - Derelict

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